2. Contents
3. Fresh Ways to Peddle Your Petals
4. Introduction
5. Importance of Flower Food
6. Care and Handling Model
7. Sourcing and Variety and Knowledge
8. Sanitation
9. Hydration
10. Storage
11. Nutrition - Fresh Flower Food
12. Specialty Cut Flowers Improved by Flower Food
13. In-House Experiments
14. Floralife® FloraCare® Dosing Systems
15. Floralife® FloraCare® Dosing System Maintenance
16. Ethylene Sensitive Flowers
17. EthylBloc™ Technology
18. EthylBloc™ Technology Apple Test
19. Quick Tips for Testing EthylBloc™ Technology
20-21. Know Your Water Quality
22. General Care and Handling of Potted Green Plants
23. Addendum: Specific Crop Treatments
Get ’Em Ready.
Unpack and process your flowers immediately. Begin by removing foliage below water level to prevent rotting. Start with the most expensive and problem flowers.

Get Cutting.
Give all flowers a fresh cut. It helps ensure hydration.

Please Feed.
Place flowers in a flower food solution. They need to be nourished for maximum enjoyment. Flower foods generally contain:
- An acid to lower the pH of the solution. Flowers like a pH of 3 - 4.5 depending on water quality.
- Ingredients to keep the stems free flowing.
- An energy source (sugar) to nourish the flowers.

Measure Up.
Measure flower food correctly to maximize results. Mark gallon levels on the side of your stock buckets. Take the guesswork and labor out of this step and utilize a FloraLife® FloraCare® Dosing System unit.

Keep Cool And Humid.
Place in a 34 – 38˚F cooler with 80 - 90% humidity. This is crucial. Maintaining low temperature and high humidity is important to reduce water loss and maximize shelf life.

Soak It Up.
Soak floral foam shapes in a FloraLife® Flower Food solution.

Clean It Up.
Clean buckets and coolers with FloraLife® D.C.D.® Cleaner. This helps inhibit bacteria problems. FloraLife® D.C.D.® Cleaner solution also helps keep buckets clean days after treatment.

Finishiing Touch!
Place in a 34 – 38˚F cooler with 80 - 90% humidity. This is crucial. Maintaining low temperature and high humidity is important to reduce water loss and maximize shelf life.
The following flower care and handling techniques have been thoroughly investigated and tested at retail level. These techniques have been shown to greatly enhance the customer’s satisfaction of all fresh cut flowers, while decreasing waste and dumpage. Some general increases by important flowers are listed below:

**‘CHARLOTTE’ ROSE VASE LIFE**

<table>
<thead>
<tr>
<th>Treatment (Holding Solution)</th>
<th>Vase Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwater Cut / Quick Dip / One of Floralife Flower Food Solutions</td>
<td>9.8 Days</td>
</tr>
<tr>
<td>Underwater Cut / Water*</td>
<td>6.8 Days</td>
</tr>
</tbody>
</table>

* 44% increase in vase life over plain water
  (experiment #053100)

**IMPROVED ‘DELPHI’ CARNATION VASE LIFE**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Vase Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwater Cut / Ethylene Inhibitor / One of Floralife Flower Food Solutions</td>
<td>21 Days</td>
</tr>
<tr>
<td>Underwater Cut / Water*</td>
<td>7 Days</td>
</tr>
</tbody>
</table>

* 200% increase in Vase Life

* These treatments will be explained in this manual.

Also, you will realize a large decrease in dumpage. This translates to direct dollars into your wallet. The following numbers are taken from a before and after study done at a flower distributor:

1. Carnation shrinkage was reduced from 15.1% to 9.5% because they initiated the use of underwater cutting and an ethylene inhibitor product.

2. Consumer complaints for roses were reduced by 21% after the implementation of underwater cutting, HydraFlor 100 Hydrating Treatment and one of the Floralife Flower Food solutions.

3. Consumer complaints concerning arrangements were reduced by 38.1%.

These are just a few of the benefits from implementing a postharvest care and handling program. The bottom line is that you will be selling **QUALITY** fresh flowers.
Why Is It Important To Use Flower Food?

While a flower is still attached to a plant with roots, it receives nourishment which allows it to grow and develop. When the flower is cut from the plant it loses its source of nourishment and water. Fresh cut flower food was developed to simulate the flower’s originate environment and allow for the flower to fully develop and open. Used properly, flower food will greatly increase the vase life and provide greater enjoyment to the customer.

Here are the key functions of a fresh flower food.

1. **Nutritional source** - Plants produce sugar through photosynthesis from water, carbon dioxide, and sunlight. When a flower is cut from the plant, photosynthesis is no longer an option for the production of sugar. Floralife flower food provides a nutrient supplement to assure the continuation of development of the flower bud into a fully opened and beautiful flower. With the use of flower food, the flower will perform better in terms of size, color, and vase life.

2. **Hydration** - Flower food helps lower the pH which keeps the water and food conducting system in flowers working at maximum efficiency. When a flower has been dehydrated through the normal course of postharvest and shipping it needs a jump-start. When the pH of a solution if more acidic, the molecules are more hydrophilic . . . or they tend to stick together more. A good flower food includes an agent to lower the pH of the solution which encourages hydration, keeping the tiny tubes, or vessels, in the stem continually drawing up water.

3. **Stem Unplugger** - From grower to end consumer in the transport chain, a flower is exposed to many chances of becoming exposed to debris which can clog the stems, resulting in the reduction of ability to take up water and nutrients. This blockage can easily shorten the life of a flower and result in a higher percentage of non-usable products by the retail florist, or even an unhappy customer. Flower food includes a special ingredient to keep the water uptake flowing.

Homemade versions, or recipes, of flower food do not contain all the necessary ingredients vital to sustaining flower life. Aunt Martha’s old recipe recommendation of using copper pennies, aspirin, soda, or chlorine in water, for example, are ineffective and can end up costing you more than the cost of commercially produced flower food. It is important to make sure the end consumer’s flowers are fully developed and long lasting. This in turn results in repeat flower sales. If the consumer’s overall perception of flowers is that they do not last as long as they should, then they may turn to alternative gift ideas, hurting the floral industry as a whole.
Care and Handling Model

Sourcing Inspection

Hydration

Sanitation

Flower Food

Storage

Ethylene Treatment
Sourcing and Variety Knowledge

SOURCING: Sourcing flowers is very important. It is the first step in ensuring the best quality flowers for your customers. The adage widely used in the computer industry “garbage in garbage out” is a good example of this concept. For example, you may be the most conscientious retailer from a postharvest point of view, but if you start with bad product (garbage in) it won’t matter what you do. Chances are the flowers will still be of low quality when your customer receives them (garbage out). Remember, we are not buying and selling widgets, but flowers, a biologically perishable product. The cheapest is not necessarily the best. Below are some helpful tips:

1. **Do your homework.** Check to make sure your wholesaler is committed to quality. Does your wholesaler use proper care and handling techniques? Do they use good refrigeration, clean buckets, etc.?

2. **Periodically test the flowers in your shop.** Know what you are sending to your customers.
   - Ethylene sensitive flowers such as carnations can be tested for an anti-ethylene treatment by using the “Apple Test” (see reference 1, page 9).
   - Non-ethylene sensitive flowers can be tested in fresh flower food using the In-house Experiment test (see reference 2, page 14).

Flower testing should be ongoing, designed around a complete quality control program. Not only will you be controlling your quality, but learning the best varieties at the same time. *(Beware: Don’t jump to any major conclusions based on one in-house test.)*

3. **Work with one source, if possible.** That eliminates inconsistencies in your quality and makes it easier to track down any possible problems. A solid relationship with your supplier is crucial to your quality efforts.

VARIETY KNOWLEDGE: When you set out to purchase your first car or house, most likely your thoughts weren’t, “I want a red car or I want a red house,” but, “I want a car made by Ford with four doors, front wheel drive, a CD player and leather interior.” “My house should have four bedrooms, three floors, two bathrooms . . . .” All right, you get the point. But, you reply, these are huge purchases requiring large sums of money. Do I need to put that much thought into it? That’s right, you do. But, in one year, aren’t the flowers you buy as much or more of a huge expenditure than a nice car? However, florists continue to order flowers by color (pink or red), not having any idea which variety of flowers they are or the characteristics of the flowers.

   - Rose varieties vary greatly in vase life and quality problems like bent-neck susceptibility, ethylene susceptibility, botrytis infection . . . just to name a few.

   - Carnation varieties vary greatly in ethylene sensitivity. Picking the right variety can cut back on carnation shrinkage.
Sanitation

Cleanliness is usually underestimated in terms of its importance concerning postharvest vase life. If we are starting with a dirty and microbe infested bucket, cooler or anything else that might come in contact with the flowers, all other attempts at postharvest care will be less effective (fresh flower food, hydration etc.). For example, if a flower is properly treated and then put into a dirty bucket, the flower may prematurely die from the microbes, regardless of the treatment. So make sure that everything that may come in contact with the flower is cleaned with DCD Cleaner, including buckets, cutters, coolers, benches, etc. DCD Cleaner is an approved cleaner for the horticulture industry.

Research has shown that buckets left dirty for four days can reduce the vase life of a rose by up to 20%.

<table>
<thead>
<tr>
<th>Bucket Status</th>
<th>Vase Life (relative days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>9.0</td>
</tr>
<tr>
<td>Dirty / Used Four Days Old</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Why use DCD Cleaner? The product is specifically designed to kill microbes over a long period of time. If you clean your buckets today, tomorrow the buckets will still be protected. Many use a chlorine bleach to clean their buckets. Chlorine is an extremely effective biocide, but does not have any residual effect, leaving no protection much past a day (see chart below).

<table>
<thead>
<tr>
<th>Bucket Treatment</th>
<th>Relative Bacterial Counts</th>
<th>Relative Fungal Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCD Cleaner</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Clorox®</td>
<td>389</td>
<td>38</td>
</tr>
<tr>
<td>Water</td>
<td>889</td>
<td>560</td>
</tr>
</tbody>
</table>

(Independent study performed at Northview Pacific Laboratories; Berkeley, CA.)

For every one bacteria found in the bucket cleaned with DCD Cleaner, there were 389 bacteria found in the bucket cleaned with Clorox®.
Hydration of Fresh Flowers

Flowers contain a waterway system (xylem) consisting of capillaries. These capillaries act like straws that carry water and nutrients to the vital areas of the flower. This important process is called “Hydration.” There are two main reasons why the hydration process might be interrupted:

1. These capillaries can become blocked and plugged. This can slow or impede hydration which can result in the acceleration of flower death.
2. Another way the waterway can be impeded is when a flower is placed in a “stressed” environment, causing air blockage. Some examples of these causes are extreme heat, lack of water and other shocks to the flower’s system.

The best way to combat these problems is by treating the flowers with a solution like Quick Dip Instant Hydrating Treatment or Hydraflor 100 Hydrating Treatment that lowers the pH of the water and keeps capillaries free flowing.

Some advantages of using these products are listed below:

1. **Prevention of bent-neck and wilting in roses:**

<table>
<thead>
<tr>
<th>Treatment Vase Life/Days</th>
<th>‘DOLORES’ ROSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Dip Instant Hydrating Treatment / Special Blend 300 Liquid Flower Food for Pure Water / Water</td>
<td>7.0 / 1.0</td>
</tr>
<tr>
<td>(Experiment #071300)</td>
<td></td>
</tr>
</tbody>
</table>

2. **Decreased wilting in cut field crops.**

3. **Some flowers that would normally be considered dumpage can now be salvaged:**
   - By lowering the pH of the water, the water uptake through the capillaries will be increased. An increase in uptake will hydrate the flower and eliminate a water stressed flower.
   - The addition of chemicals that prevent blockage in the flower will help keep the capillaries free flowing.

4. **Water stressed flowers will increase their ethylene production.**

Instructions for maximum hydration of all crops, including roses, gerbera daisies, field grown crops, mixed bouquets:

1. **Recut all flowers.**
   Recutting stems eliminates much of the blockage at the bottom of the stem (bacteria, and other blockages). If you chose to recut underwater, be sure the solution is kept sanitary and debris free.

2. **Hydrate flowers for one second in Quick Dip instant Hydrating Treatment.**
   Place two inches of Quick Dip in the bottom of a container. Dip the bottom two inches of the cut stem in the solution for one second. Or Hydrate flowers for one half to one hour in Hydraflor 100 Hydrating Treatment at room temperature or overnight at 34 - 38° F.)
Storage

Store fresh flowers in a 34 - 36° F cooler with 80 - 90% relative humidity.

Temperature is one of the most important factors influencing the vase life of flowers. By lowering the temperature, the flower’s metabolism (respiration and transpiration) is greatly reduced. The result is a decrease in the natural chemical reactions that cause flower senescence (death). Ethylene action on flowers is greatly inhibited at lower temperatures (while in the cooler only). This slowing of metabolism resembles hibernation in some mammals. An example of the importance of temperature is shown in the chart below.

### Relationship of Temperature to the Deterioration Rate of Many Flower Types

<table>
<thead>
<tr>
<th>Temperature ° F</th>
<th>Relative Deterioration Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>1 - Reference Point</td>
</tr>
<tr>
<td>37</td>
<td>2 - 3</td>
</tr>
<tr>
<td>41</td>
<td>3 - 4</td>
</tr>
<tr>
<td>50</td>
<td>4 - 6</td>
</tr>
<tr>
<td>68</td>
<td>8 - 10</td>
</tr>
</tbody>
</table>

For example, at 41° F a flower will deteriorate three-four times faster than a flower kept at 32° F. **Tropical flowers should be stored at 55 - 60° F or room temperature.**

**Relative Humidity:**

Relative Humidity is also a very important storage variable, especially if the temperature is above 32 - 34° F. The proper amount of water in the air will inhibit the fresh cut flower from the process of transpiration. When a flower goes through the process of transpiration, it loses water causing water stress. Water stress can cause many undesirable effects like bent neck and premature wilting. The relative humidity should be kept at 80 - 90%. If the relative humidity gets too high (as approaches 100%) condensation will occur. Condensation on flowers can aggravate such problems as botrytis.

### Effect of Temperature on Vase Life

- 37° F: 12 days
- 41° F: 10 days
- 68° F: 2 days
Nutrition - Fresh Flower Food

The importance of using a Floralife Flower Food with fresh cut flowers is well documented. Floralife Flower Food gives flowers the food they need, decreases bent neck and increases bud opening in many varieties like ‘Classy’ Roses.

A Floralife Flower Food is formulated to give these benefits by providing the following ingredients:

- **Sugar** - Providing a carbohydrate, as an energy source to keep the rose alive.
- **Acidifier** - Increasing & maintaining the uptake of water & nutrients by lowering the pH of the water.
- **Stem unpluggers** - Surfactants and a low pH can help eliminate stem plugging. Fresh cut flowers will only receive these benefits when flower food is used at the correct concentration. To show how important the proper amount of flower food is to flower life, a test was completed placing ‘Royalty’ and ‘Samantha’ roses in different amounts of fresh flower food solutions. Three leading fresh flower food brands were used. The following chart displays the average flower life at each level of fresh flower food use:

<table>
<thead>
<tr>
<th>Amount of Fresh Flower Food Used</th>
<th>Flower Life in Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended rate (10 g/l)</td>
<td>8.4</td>
</tr>
<tr>
<td>Twice the recommended rate (20 g/l)</td>
<td>7.5</td>
</tr>
<tr>
<td>One-Half the recommended rate (5 g/l)</td>
<td>6.5</td>
</tr>
<tr>
<td>One-Fourth the recommended rate (2.5 g/l)</td>
<td>5.1</td>
</tr>
<tr>
<td>Water</td>
<td>6.4</td>
</tr>
</tbody>
</table>

This data verifies the importance of using the recommended amount of fresh flower food for the best results.

When the Floralife Flower Food was doubled, the vase life decreased. This is probably due to some toxicity of the components in the fresh flower food at high concentrations.

More startling is the data that shows that using less than the recommended amount is no better than, or even worse than, using plain water. Not using enough fresh flower food will promote stem blockage, resulting in decreased flower life.

*Unfortunately, it has been estimated that more than 50% of all fresh flower foods used are at too low of a concentration!*

The easiest way to make certain the correct amount of fresh flower food is used at all times is with an automatic proportioner. Proportioners guarantee each bucket, vase, container, etc. has the right amount of fresh flower food, automatically.
Specialty Cut Flowers Improved by Flower Food

- Alstroemeria: 49.3%
- Dahlia: 50%
- Delphinium / Larkspur: 35.4%
- Foxglove: 79.4%
- Gerbera: 154.7%
- Gladiolus: 59.5%
- Jolly Jumper Asters: 157.4%
- Lily: 50%
- Scabiosa: 53.3%
- Snapdragon: 110.2%
- Sunflower: 50%
- Tulips: 30.8%
- Wax Flower: 114.3%
- Yarrow: 247%

% better than when held in plain water
In-House Experiments

9 STEPS TO SUCCESSFUL IMPLEMENTATION**
Experiment: Fresh Cut Flower Food Solution vs. Plain Water

1. Remember that to make the test data worthwhile you must be consistent throughout the experiment. Setting up the experiment and not looking at it for a week will not only give you useless data, but waste your flowers.

2. Begin by getting 30 high quality flowers - poor quality flowers will bring poor results. Be sure the flowers are all the same variety from the same shipment from the same grower. This will eliminate some of the variables in the experiment and make the results more realistic.

3. Use 6 identical vases or jars. Label 3 water and 3 fresh flower food. Fill each container with the same amount of water. In the 3 containers labeled fresh flower food, add the recommended amount of fresh flower food (10 grams per quart).

4. Cut all flower stems and randomly place the flowers in the containers. Each container will have 5 flowers.

5. These jars should all be placed near each other, so all of them are exposed to similar environmental effects. Do not place them near a draft or in direct sunlight.

6. Data should be taken by the same person every day. This person will have to decide when the flowers are dead or when they would be discarded by your customers. This person will have to be consistent in his / her decisions.

7. Once a flower stem is considered dead, record how long the flower lived in days and discard the flower. For example, if the experiment was set up on Monday and by Friday the flower was dead, then the flower lasted 4 days. **Do not count the set up day.**

8. After all the flowers in the jar have died, add the five day lengths together and divide by 5. For example: 4+5+5+5+6 = 25/5 = an average vase life of 5 days for that one jar. Do this for every jar. Next add the three jars’ averaged days together from each type of treatment and divide by 3. For example: 5 days +6 days + 7 days / 3 = 6 days. That is the average number of days that the group of flowers lived.

9. The two values can now be compared and a realistic figure on the difference between the two treatments can be found. This now means that you know how many days longer on an average, the fresh flower food treated flowers lasted compared with those kept in water.

** This guide can be used for all of your testing. With more treatments added you can compare more procedures or crops. Remember: quality flowers, controlled environment, and multiple testing help to make the results more valuable. Do not make any recommendations or changes with just one test; multiple testing is needed.
The Floralife® FloraCare® Dosing System

The Floralife® FloraCare® Dosing System should be used to accurately dose Floralife® Flower Foods.

1. If Flower Food Clear 300 Liquid is being used, the injection unit should be set at 1.6%. (or 4 strokes per one gallon of water if using the dispensing hand pump). If your dispensing system needs to be adjusted call Floralife at (800) 323-3689 or (843) 538-3839 for instructions.

2. If a Floralife® Flower Food powder is being used the dosing should be one scoop per gallon (mixing by hand) or the injection unit should be set at 3.3%. (refer to * below)

3. If 200, Clear, ULTRA 200 or Clear ULTRA 200 storage and transport treatments are being used, the dosing should be at 40 ml per gallon (mixing by hand) or the injection unit should be set at 1%.

* To make proper fresh flower food concentrate solution for the Dosatron Injection System (this is only for powders):

   a. When the fresh flower food tank is nearly empty or every three weeks, whichever comes first, dump the remaining solution down the drain.
   b. Remove the tube and filter. Clean the tank with D.C.D.® Cleaner.
   c. To refill the tank after cleaning, add the proper amount of fresh flower food FIRST. Then add the amount of water indicated and stir.
   d. Put the suction tube back into the tank, making sure the filter is submerged into the fresh flower food solution.

<table>
<thead>
<tr>
<th>Tank Size Gallons</th>
<th>Fresh Flower Food Added (lb)</th>
<th>Water Added To the Gallon Mark</th>
<th>Total Gallons Use Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
<td>4</td>
<td>120</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
<td>20</td>
<td>660</td>
</tr>
<tr>
<td>60</td>
<td>100</td>
<td>40</td>
<td>1,320</td>
</tr>
</tbody>
</table>

Be sure to clean your dispensing system regularly.
The Floralife® FloraCare® Dosing System Maintenance

What: Floralife® FloraCare® Dosing System units are water powered systems designed to properly measure and mix Floralife® Flower Food solutions. These systems are easily installed in your shop or warehouse and quickly pay for themselves in terms of time and accuracy. Research shows that improperly measured flower food is worse that not using flower food at all.

Who: Floralife® FloraCare® Dosing Systems are designed for use by professional wholesale florists, retail florists and growers.

How: These systems can easily be mounted on a wall. A fresh water source is connected to one end of the system. The system then draws concentrated solution from a Floralife bucket or drum, mixes it with the correct amount of water, and then dispenses it through a hose and wand.

<table>
<thead>
<tr>
<th>Floralife® FloraCare® Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower Food Clear 300</td>
</tr>
<tr>
<td>Flower Food 300</td>
</tr>
<tr>
<td>Clear 200 storage and transport treatment</td>
</tr>
<tr>
<td>200 storage and transport treatment</td>
</tr>
<tr>
<td>D.C.D.® Cleaner</td>
</tr>
<tr>
<td>Hydraflor® 100 hydrating treatment</td>
</tr>
</tbody>
</table>

Frequently Asked Questions:

Q: How often do I need to clean my dosing system?
A: Monthly.

Q: Why isn’t any liquid being drawn up from the Floralife® Flower Food concentrate bucket?
A: Check the following:
  - The Floralife® Flower Food concentrate bucket still has solution in it.
  - The tube is not sealed to the bottom of the unit (has an air leak).
  - The clear tube could be stretched at the top or not pushed up all the way.
  - The weight at the bottom of the tube is missing.
  - The screen on the bottom of the tube is clogged.
  - The tube is kinked or has a hole.

Q: The concentrate solution bucket is filling up with water.
A: The check valve in the bottom of the unit is not working: clean or replace.

Q: Only a small stream of water is coming through.
A: Check the following:
  - Check your water pressure.
  - See if the system is clogged due to improper care and cleaning.

For more information, contact www.dosmatic.com
Ethylene Sensitive Flowers

When flowers are properly treated with an ethylene action inhibitor you can expect some of the following benefits:

1. ** Longer Flower Life.** Ethylene inhibitor products such as EthylBloc™ Technology will greatly increase the vase life of ethylene sensitive flowers. The following experiments performed at Floralife show this fact:

<table>
<thead>
<tr>
<th>Flower</th>
<th>% Increase over untreated</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘First Red’ Rose</td>
<td>+303%</td>
</tr>
<tr>
<td>‘Colorado Gold’ Carnation</td>
<td>+103%</td>
</tr>
<tr>
<td>‘Belladonna’ Delphinium</td>
<td>+47%</td>
</tr>
<tr>
<td>‘Gilboa’ Gypsophillia</td>
<td>+38%</td>
</tr>
</tbody>
</table>

2. **Increased Bud Opening.** EthylBloc™ Technology will not only increase the vase life of flowers like Alstroemeria and lilies, but will also increase the number of fully open buds from 60% to 93% of total buds.

3. **Prevents Premature Shattering.** EthylBloc™ Technology can prevent the premature shattering of florets in Snapdragons, Delphinium and Agapanthus.

1. Check to see if your flower sources are using an anti-ethylene treatment. Use the Apple Test (see reference 1, page 19)

If not . . .

2. Treat flowers with an anti-ethylene product, such as EthylBloc™ Technology.
   - Use the Apple Test to insure that the flowers are being treated correctly.

Ethylene Sensitive Flowers

<table>
<thead>
<tr>
<th>Achillea</th>
<th>Campanula</th>
<th>Doronicum</th>
<th>Lavatera</th>
<th>Rudbeckia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aconitum</td>
<td>Carnation</td>
<td>Echium</td>
<td>Lily</td>
<td>Saponaria</td>
</tr>
<tr>
<td>Agapanthus</td>
<td>Celosia</td>
<td>Eremurus</td>
<td>Limonium</td>
<td>Scabiosa</td>
</tr>
<tr>
<td>Alchemilla</td>
<td>Centaurea</td>
<td>Eustoma</td>
<td>Lisianthus</td>
<td>Silene</td>
</tr>
<tr>
<td>Allium</td>
<td>Chelone</td>
<td>Fresia</td>
<td>Lysimachia</td>
<td>Snapdragon</td>
</tr>
<tr>
<td>Alstroemeria</td>
<td>Consolida</td>
<td>Francoa</td>
<td>Mini Carnation</td>
<td>Solidaster</td>
</tr>
<tr>
<td>Anemone</td>
<td>Cymbidium</td>
<td>Gladiolus</td>
<td>Monkshood</td>
<td>Stock</td>
</tr>
<tr>
<td>Aquilegia</td>
<td>Crocosmia</td>
<td>Godelia</td>
<td>Orchids (some)</td>
<td>Sweet Pea</td>
</tr>
<tr>
<td>Asclepias</td>
<td>Daucus (Queen-</td>
<td>Gypsophila</td>
<td>Phlox</td>
<td>Sweet William</td>
</tr>
<tr>
<td>Astilbe</td>
<td>Anne s Lace)</td>
<td>Helianthus</td>
<td>Penstemon</td>
<td>Trachelium</td>
</tr>
<tr>
<td>Astrantia</td>
<td>Delphinium</td>
<td>Ixia</td>
<td>Physostegia</td>
<td>Trollius</td>
</tr>
<tr>
<td>Bouvardia</td>
<td>Dendrobium</td>
<td>Kniphofia</td>
<td>Ranunculus</td>
<td>Veronica</td>
</tr>
<tr>
<td>Brodiaea</td>
<td>Dicentra</td>
<td>Larkspur</td>
<td>Rose*</td>
<td>Wax Flower</td>
</tr>
</tbody>
</table>

*Cultivar specific*
**What is Ethylene?**
The USDA attributes about 30% of shrink to ethylene. Ethylene is a gaseous plant hormone that profoundly influences the growth and development of plants. Some deleterious effects of ethylene exposure include leaf yellowing, flower (or petal) drop, irregular opening, and premature death. Any individual flower produces ethylene, but it is also susceptible to ethylene produced by many other sources (including produce, propane heaters, gas-powered forklifts, cigarette smoke, other flowers).

Ethylene levels above 100 ppb can do damage to flowers over time periods greater than 24 hours. Levels of about 250 ppb can do damage to flowers in as little as 12 hours.

It is important to understand the small amount that 100 ppb represents. If you add 100 drops of food coloring to 26,400 gallons of water, the concentration of the food coloring is 100 ppb.

**What is EthylBloc™ Technology?**
EthylBloc™ Technology is a powder that, when mixed with water or a buffer solution, releases a gas to extend the life and usefulness of many fresh cut flowers, potted flowering, bedding, nursery and foliage plants. Crops are treated with this gas in enclosed areas such as rooms, coolers, greenhouses, truck trailers and shipping boxes / containers. **ETHYLBLOC™ TECHNOLOGY IS THE FIRST AND ONLY PATENTED, EPA APPROVED ETHYLENE ACTION INHIBITOR.**

**How does EthylBloc™ Technology work?**
EthylBloc™ Technology works by inhibiting the negative effects of ethylene and thus prevents or reduces premature flower death, leaf and/or flower fall, and leaf yellowing. The active ingredient in EthylBloc™ Technology binds to the ethylene receptor in plant cells. This prevents binding of harmful ethylene from the plant itself or external sources. It is the binding of ethylene to the receptors that causes damage—NOT the production of ethylene.

**Who should use EthylBloc™ Technology?**
EthylBloc™ Technology is designed to be used by all levels of the floral and nursery industries including growers, shippers, wholesalers, bouquet manufacturers, mail order houses and retailers (such as florists, garden centers, nurseries and mass market outlets). EthylBloc™ Technology is nontoxic and very easy to use with almost no labor costs.
EthylBloc™ Technology Apple Test

For determining EthylBloc™ Technology product effectiveness, Floralife developed a simple experiment to test your EthylBloc™ Technology treatment.

Materials Needed:
- Two large, very ripe apples that are at room temperature. An apple is a large producer of ethylene as it ripens.
- Two vases or quart canning jars labeled #1 and #2.
- One tall waste basket, bucket or ice chest that has a good seal and has a known volume.
- One bunch of fresh carnations (larkspur, white stock) that have not been treated with an anti-ethylene product . . . IMPORTANT!

Procedure:
For Vase #1
Place 8 flowers in vase #1 containing a Floralife fresh flower food. Place vase / flowers in the sealable bucket. Partially close the lid. In a small cup, pour the appropriate amount of buffer (see label directions). Immediately before closing the bucket, add the amount of EthylBloc™ Technology powder for a 4 - 6 hour treatment to the buffer solution. Promptly seal the bucket. Wait 4 - 6 hours before taking the flowers out of the bucket and proceed to vase #2.

For Vase #2
Recut a second group of 8 carnations and place them directly into vase #2, which also contains one of Floralife’s Flower Food solutions at the recommended concentration. This vase represents the untreated flowers.

Combining Vases #1 and #2
Place the two vases and the two apples carefully under the wastebasket, so that the wastebasket is standing upside down and completely covering the vases and the apple. Allow the flowers (with the apples) to remain covered for 24 hours at room temperature (72° F or 22° C). After the 24-hour period, remove the two vases containing the flowers and place them on a table to observe their respective vase lives.

Description of Results

<table>
<thead>
<tr>
<th>IF . . .</th>
<th>THEN . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowers in all vases die in 5 days or less . . .</td>
<td>The flowers were bad to begin with OR your EthylBloc™ Technology did not work. Redo the test.</td>
</tr>
<tr>
<td>Flowers in both vases lasted more than 10 days . . .</td>
<td>The flowers were all properly treated with an antiethylene product before you received them. Redo the test.</td>
</tr>
<tr>
<td>Flowers in vase #1 lasted twice as long as vase #2 . . .</td>
<td>The EthylBloc™ Technology is effective in preventing ethylene damage.</td>
</tr>
</tbody>
</table>

Note: This test can also be used for potted plants. Substitute the vases of flowers for ethylene-sensitive plants (plants which are in bloom).

If you have any questions and / or comments regarding the test procedures and / or test results you obtain, please call Floralife’s Technical Service at 800.323.3689.
Quick Tips for Testing EthylBloc™ Technology

The following is a list of tips to insure the proper use of EthylBloc™ Technology in a test setting.

**The Treatment Chamber**
1. Be sure the container is sealed on all sides. A plastic tent, refrigerated shipping container, storage cooler or any sealed chamber should be adequate.
2. A fan or some type of device to insure air movement in the chamber is best.
3. Be sure to follow the time/temperature directions, a lower temperature will require a longer treatment time.

**Mixing the Powder**
1. Be sure to mix the powder in the treatment chamber. Gas is released immediately upon mixing. Mixing the powder outside the chamber will result in an immediate loss of at least 25% efficacy.
2. The powder becomes soluble when the gas is released. If at the end of the treatment there is powder remaining in the mixing container the gas was not completely released (a small residue usually sits on the bottom of the mixing, even if all the gas has been released). If this becomes a problem use a stirrer or heater.

**Treatment of Plants**
1. If flowers are being tested, the flower must not be treated with Silver Thiosulfate (STS). Most ethylene sensitive flowers (see list in instructions) are treated at grower level with antiethylene chemicals. Thus, special instructions must be given to the grower. If flowers were previously treated with STS, EthylBloc™ Technology will have little effect.
2. An effective bioassay testing the proper treatment can be performed using the apple test—see attached ref.1
3. Symptoms of ethylene damage in the control groups are crop specific and may vary (i.e. carnations “go to sleep”, delphiniums drop their flowers).
4. Applying an ethylene source after treatment will produce better results (as in the “real world”).
5. For flowers not considered “ethylene sensitive”, positive results may not be obvious unless exposed to high levels of ethylene after the EthylBloc treatment.
6. Flowers must not be considered “old”. As in any antiethylene chemical the efficacy decreases with older crops.
7. Florets must show color for effective treatment.
Know Your Water Quality . . .
Your Flowers are Depending on You!

Unsure of your water quality? The labs at Floralife can clear things up for you!

We analyze four parameters when you send in a water sample:
- pH
- TDS (total dissolved solids)
- Alkalinity
- Hardness

**pH**
The pH is simply a measure of how acidic or basic your water is on a scale of 0 to 14. A pH of less than 7 is acidic; 7 is neutral; and greater than 7 is basic. The pH alone doesn’t reveal much about water quality, but how easily the pH changes (buffering capacity) is important. Typically, water alone will have a pH range of 5 to 8. Combined with flower food, the usual pH will be between 3 and 5, or slightly acidic. A slightly acidic solution increases water uptake and prevents bent neck. Fresh cut flowers benefit from a pH in the range of 3-4.5. What does the pH value tell you? A change in 1 pH unit is a tenfold change in the acidity. For example, a pH of 6 is 10 times more acidic than a pH of 7.

**TDS**
The TDS is a measure of all the dissolved solids in the water (measured in parts per million or ppm). The level of TDS is important. High levels of certain salts can potentially reduce flower life. The mixture of dissolved solids is also important. A mixture of moderate levels of calcium, magnesium, potassium, and sulfates can be beneficial, while a mixture of high levels of iron, fluoride, and sodium can be harmful. To explore the TDS further, alkalinity and hardness are analyzed. These properties can be considered a part of the TDS.

**Alkalinity**
The alkalinity level of your water describes its buffering capacity (ability to resist pH changes). A higher alkalinity means that the water contains a higher amount of carbonates, bicarbonates, and hydroxides, which resist the lowering of the pH (and potentially reducing the effectiveness of flower food). When recommending water specific flower foods, water with alkalinity less than 60 ppm is considered pure (recommending Special Blend 300 flower food for pure water); from 60 ppm to 180 ppm is considered medium (recommending Floralife® Flower Food); and greater than 180 ppm is considered hard (Special Blend 300 flower food for hard water). Alkalinity is the most important factor when considering how cut flowers will react to your water.

continued
Occasionally, water will have such high alkalinity that no flower food is able to bring the pH down into the acceptable range. In these extreme cases (usually with alkalinity much greater than 300 ppm), a deionizing or reverse osmosis system is recommended. These systems remove all of the ions from the water; beneficial ions are added back to the water by using flower food.

**Hardness**

The level of hardness refers to the amount of calcium and magnesium in your water (measured in ppm). Typically, these levels are not a good indicator of how cut flowers will react in your water. In general, most highly alkaline waters also have high hardness levels. If you have hard water, it is not recommended that you install a water softener. A softener replaces calcium and magnesium ions with sodium ions, which tend to be harmful for flowers at high levels.

Together, pH, TDS, alkalinity, and hardness can tell you how your flowers will react to your specific water type.

Floralife labs will test your water free of charge. Interested in sending in a sample for testing?

1. Rinse out a bottle (at least 1 pint) several times with your tap water.

2. Include your name, address (where report should be mailed), and phone number (in case questions arise).

3. Mail to Floralife, Attn: Laboratory, 751 Thunderbolt Drive, Walterboro, SC, 29488.
General Care and Handling of Potted and Green Plants

When plants are received:
1. Unpack shipments as soon as possible.
2. Remove packaging sleeves.
3. Record and report damage (including extreme temperatures and physical damage.)

Watering:
Improper watering is the number one problem with plants at the retail/supermarket level!
1. Water all plants after unpacking.
2. Water plants until water is draining out of the holes on the bottom of the pot.
3. Do not leave plants sitting in water for extended periods of time.
4. Check soil daily:
   - Push your finger 1 inch into soil. If the soil feels moist, the plant does not need watering. If the soil feels dry, then watering is required. Watering requirements vary by variety of plant.
5. To complete the hydration process, spray plants with Floralife® Finishing Touch Spray.

Fertilizer:
Most potted plants arrive to stores over-fertilized and need to be watered upon arrival (this will leach the soil). There is no need to fertilize most plants at the store level. A general purpose fertilizer can be used by consumers.

Storage:
Temperature:
In general, potted plants should not be stored at 34 - 38°F at the store level (there are exceptions).
Storage of plants varies between crops, so when in doubt, leave plants at room temperature (68 - 70° F).
Check with your plant source for recommendations concerning specific crops.

Light:
Display plants under a combination of 80% fluorescent: 20% incandescent light (wattage ratio). This brings out the true colors of the plants. Consumer’s light levels to maintain the size and fullness of plants vary between varieties. Check specific requirements for each plant.
Specific Crop Treatments

Agapanthus
Alstroemeria
Anthurium
Monte Casino Aster
Bouvardia
Carnation
Daffodil
Delphinium / Larkspur
Freesia
Gerbera
Gladiolus
Gypsophila
Hydrangea
Iris
Lisianthus
Dendrobium Orchid
Queen Anne’s Lace
Rose
Snapdragon
Statice
Stock
Sunflower
Tulip

Permission for use of some flower photos given by the California Cut Flower Commission.
Agapanthus

Common Names: Lily of the Nile, Blue African Lily
Family: Liliaceae
Common Species: Agapanthus praecox
Origin: South Africa

Grower Recommendations
Agapanthus are ethylene sensitive. They benefit from an anti-ethylene treatment such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as soon as possible after harvest. After cutting, place Agapanthus stems in a solution of HydraFlor® 100 for 1 hr. (or up to overnight at 34 - 38° F). Transfer stems to a solution of one of the Floralife® 200 storage and transport treatment products. Please contact Floralife for specifics.

Wholesaler/Retailer Recommendations
Buying Tips:
Ask: Has product been pretreated with an anti-ethylene product, such as EthylBloc™ or EthylGuard? What is the source of the product? What is the cultivar name? Has the product been stored dry or wet?

Processing:
Remove foliage below water level. Recut stems.

Pretreatment:
If the Agapanthus have not been treated with an anti-ethylene product, treat them as soon as possible. Or if agapanthus have been treated with an anti-ethylene product, use one of Floralife’s Flower Food 300 products (see Holding Solution) to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatment, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

Storage:
Place Agapanthus in a 34 - 38° F cooler with 80 - 90% humidity.

Cleaning:
Use D.CD.® Cleaner to clean buckets, vases, coolers, etc. D.CD.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.

Troubleshooting:
Problem:
Can be caused by excessive drying out, rough handling, old age, and/or exposure to ethylene. Check with your supplier on harvest date. Make sure an anti-ethylene pretreatment is performed and one of Floralife’s Fresh Flower Foods is used.
**Specific Crop Treatments**

**Alstroemeria**

Alstroemeria, Peruvian Lily  
Family: *Amaryllidaceae*  
Species: *Alstroemeria*  
Origin: South America

**Grower Recommendations**

Agapanthus are ethylene sensitive. They benefit from an anti-ethylene treatment such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as soon as possible after harvest. Place flowers into a holding solution of a properly mixed FloraLife Flower Food 300 or they can be dry stored or shipped.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
Ask: Has product been pretreated with an anti-ethylene product, such as EthylBloc™ or EthylGuard? What is the source of the product? What is the cultivar name? Has the product been stored dry or wet? Do not buy flowers which have leaf yellowing. Buy flowers which have 1 - 3 blooms open.

**Processing:**
Remove foliage below water level. Recut stems.

**Pretreatment:**
If the Alstroemeria have not been treated with an anti-ethylene product, treat them as soon as possible. Or if Alstroemeria have been treated with an anti-ethylene product, use one of FloraLife’s Flower Food 300 products (see Holding Solution) to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:  
FloraLife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

**Storage:**
Place Alstroemeria in a 34 - 38°F cooler with 80 - 90% humidity.

**Cleaning:**
Use D.CD.® Cleaner to clean buckets, vases, coolers, etc. D.CD.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**
Always give a packet of a FloraLife Flower Food with your designs. One liter packets treat one quart of water.

**Troubleshooting:**

**Problem:**  
Yellowing foliage

**Reason/Solution:**
Can be due to variety selection, grower practice or improper storage. Grow or purchase those that do not turn yellow as easily. May be due to ethylene exposure. Treat with an anti-ethylene product, such as EthylBloc™.
Alstroemeria, continued

Buds fail to open
Product may have been stored too long, improperly kept out of solution for an extended period or exposed to ethylene. Make sure an anti-ethylene pretreatment is used; check on storage conditions; make sure a Floralife Flower Food is used.

Abscission (flower fall), translucent flowers and petals
Make sure an anti-ethylene pretreatment is performed and that one of Floralife’s Flower Foods is used. Change varieties if problem continues.

Do not know if flowers were treated with an antiethylene product and / or treated properly
Use the "Apple Test"* to check for proper antiethylene treatment.
Anthurium

Flamingo Lily, Oilcloth Flower
Family: Araceae
Species: Anthurium andraeanum
Origin: Colombia

Grower Recommendations
Growers should treat anthuriums with a hydration product, especially if anthuriums are shipped dry pack. For a majority of growers, use Floralife’s HydraFlor® 100 hydrating treatment immediately after harvest and through grading. Treatment time will vary with temperature and storage conditions. Please contact Floralife to discuss your particular environment. Always use a Floralife Flower Food 300 or Floralife® 200 storage and transport treatment products when storing and/or shipping anthuriums “wet” (i.e., in solution). Anti-transpirant sprays have been shown to be beneficial.

Wholesaler/Retailer Recommendations

Buying Tips:
Ask: Variety name. Different varieties have different flower qualities. Learn the varieties that work best at your location.
Avoid: Flowers with purplish or blackening spathes, flowers with spots on spadix or those with blackened spadix.
Look For: Flowers with high gloss, bright colors, firm stems and spathes.

Processing:
Unpack immediately. Recut stems, especially if flowers have been dry for an extended period and/or appear visibly wilted.

Pretreatment:
HydraFlor® 100 for ½ hour - 1 hour at room temperature, depending on variety. HydraFlor® 100 encourages water uptake and ensures proper hydration, so anthuriums quickly become firm and stems remain free flowing. This is especially important for very dehydrated anthuriums. Alternatively, treat with Quick Dip 100 instant hydrating treatment under normal conditions. This one second dip helps to increase water uptake for all flowers.

There are two Floralife 100 products to consider:
1.) HydraFlor® 100: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2.) Quick Dip 100: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.
Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

Storage:
Place Anthurium in a 55 - 60˚ F cooler with 80 - 90% humidity or hold at room temperature.

Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.
Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.

Troubleshooting:
Problem: Limp, lose gloss quickly
Reason/Solution: Can be caused by prolonged exposure to high temperatures and low humidity. Avoid prolonged periods out of water hold at 55 - 60°F. NOTE: There are conflicting reports that resoaking every 2 - 3 days and daily misting mimics the warm, natural environment and encourages longer life. There is no definite data to support this. However, these techniques may be beneficial if flowers are displayed in a warm, dry area and should be tested in the individual location.

Blueing / Blackening
May be due to exposure to chilling temperatures (below 55°F), bruising or old product. Check on product age and storage conditions.
Monte Casino, Aster

**Botanical Name:** Aster ericoides  
**Family:** Asteraceae or Compositae  
**Origin:** Native to Eastern United States, ME to GA and TX  
**Pronunciation:** A-ster e-ri-KOI-deez

**Grower Recommendations**
Recommended stage of harvest is when 2 to 4 open blooms on the spike. Use FloraLife’s Hydraflo® 100 hydrating treatment for 1/2 hour immediately after harvest and then transfer flowers into a properly mixed solution of FloraLife® 200 storage and transport treatment or a FloraLife® Flower Food 300 formula. Asters are best stored at 34 - 38°F.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**  
Ask for cultivar name. Different cultivars may vary in disease resistance, ease of hydration and vase life.

**Processing:**  
Unpack immediately. Remove foliage below solution level. Recut stems.

**Pretreatment:**  
Place stems in FloraLife® Hydraflo® 100 hydrating treatment for ½ -1 hour or use FloraLife® Quick Dip 100 instant hydrating treatment. If already treated with an anti-ethylene product, such as EthylBloc® Technology. You can use FloraLife® Hydraflo® 100 hydrating treatment for ½ to 1 hour at room temperature, depending on variety. Hydraflo® 100 hydrating treatment encourages water uptake and ensures proper hydration, so they quickly become firm and stems remain free flowing. Alternatively, treat with FloraLife® Quick Dip 100 hydrating treatment under normal conditions. This one second dip helps to increase water uptake for all flowers. Using one of FloraLife’s hydration pretreatments can help prevent dehydration of aster.

**Holding Solution:**  
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:  
FloraLife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.

**Ethylene Sensitivity:** Low ethylene sensitivity.

**Vase Life:** 8 to 12 days.

**Storage:** 34 -36°F cooler / 75-85% humidity.

continued
Specific Crop Treatments

Monte Casino, Aster, continued

Troubleshooting:

Problem: Blackening of stems

Reason / Solution: Excessive storage can be a cause for this problem. Try to purchase cultivars which are less prone to this problem.

Cleaning:

Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:

Always give a packet of a Floralife® Flower Food with your designs. One liter packets treat one quart of water.
Bouvardia Hybrids
Family: Rubiaceae
Genus: Bouvardia
Origin: Mexico

Grower Recommendations
Bouvardia are ethylene sensitive and benefit from an anti-ethylene treatment such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as soon as possible after harvest. After cutting, place Bouvardia stems in a solution of HydraFlor® 100 for 1 hr. (or up to overnight at 34 - 38˚ F). Transfer stems to a solution of one of the 200 storage and transport treatments. Please contact Floralife for specifics.

Wholesaler/Retailer Recommendations

Buying Tips:
Ask: Has product been pretreated with a commercial anti-ethylene product, such as EthylBloc™ or EthylGuard? What is the source of the product? What is the cultivar name? Has the product been stored dry or wet?

Processing:
Remove foliage below water level. Recut stems.

Pretreatment:
If the Bouvardia have not been treated with an anti-ethylene product, treat them as soon as possible with EthylBloc™. Or if Bouvardia have been treated with an anti-ethylene product, use HydraFlor® 100 to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

There are two Floralife 100 products to consider:
1.) HydraFlor® 100: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2.) Quick Dip 100: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

Storage:
Place Bouvardia in a 45 - 55˚ F cooler with 80 - 90% humidity. Bouvardia are chill sensitive.

Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a Floralife Fresh Flower Food with your designs. One liter packets treat one quart of water.
Bouvardia, continued

Troubleshooting:
Problem:
Flowers and leaves are limp

Reason/Solution:
Can be due to extended period out of water, exposure to extreme temperatures, or low relative humidity. Bouvardia are in general very wilt sensitive, hydration solutions will be very beneficial. Process immediately upon arrival; make sure all stems are recut under water, use one of FloraLife’s Fresh Flower Foods and store under proper refrigeration (45 - 55˚ F and 80 - 90% relative humidity).
Carnation

Carnation, Miniature Carnation
Family: Caryophyllaceae
Genus: Dianthus
Origin: Central & Southern Europe

Grower Recommendations
Carnations and miniature carnations are ethylene sensitive. They benefit from an anti-ethylene treatment such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as soon as possible after harvest. After cutting, place carnation stems in a solution of HydraFlor® 100 for 1 hr. (or up to overnight at 34 - 38˚ F). Transfer stems to a solution of one of the 200 storage and transport treatment products. Please contact Floralife for specifics.

Wholesaler/Retailer Recommendations

Buying Tips:
Ask: Has product been pretreated with an anti-ethylene product, such as EthylBloc™ or EthylGuard? What is the source of the product? What is the cultivar name? Has the product been stored dry or wet?

Processing:
Remove foliage below water level. Recut stems.

Pretreatment:
If the carnations or mini-carnations have not been treated with an anti-ethylene product, treat them with a commercial anti-ethylene product such as EthylBloc™ as soon as possible. Or if carnations have been treated with an anti-ethylene product, use one of Floralife’s Flower Food 300 products (see Holding Solution) to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

Storage:
Place Carnations in a 45 - 55˚ F cooler with 80 - 90% humidity.

Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
## Carnation, continued

### Troubleshooting:

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early sleepiness</td>
<td>Most likely due to exposure to ethylene and / or high temperatures during shipping and / or storage. This may also indicate improper or no anti-ethylene treatment. Find out if the flowers have been treated with an anti-ethylene product and / or look into purchasing cultivars which are less ethylene sensitive.</td>
</tr>
<tr>
<td>Split Calyx</td>
<td>Likely due to production conditions and age of product.</td>
</tr>
<tr>
<td>Buds fail to open</td>
<td>Product may have been stored too long or improperly kept out of solution for an extended period, or exposed to ethylene. Make sure anti-ethylene pretreatment is used; check on storage conditions; make sure one of Floralife’s Flower Foods is used.</td>
</tr>
<tr>
<td>Do not know if flowers were anti-ethylene treated and / or treated properly</td>
<td>Use the “Apple Test”* to check for proper antiethylene treatment.</td>
</tr>
</tbody>
</table>
Daffodil

Daffodil, Narcissus, Jonquil, Paper Whites
Family: Amaryllidaceae
Species: Narcissus pseudonarcissus
Origin: Europe (Southwestern)

Grower Recommendations
Daffodils are ethylene sensitive. They benefit from an anti-ethylene treatment such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as immediately after harvest. After cutting, place carnation stems in a solution of HydraFlor® 100 for 1 hr. (or up to overnight at 34 - 38˚ F). Transfer stems to a solution of one of the Floralife® 200 storage and transport treatment products. Please contact Floralife for specifics.

Wholesaler/Retailer Recommendations

Buying Tips:
Ask: Variety name. Different varieties have different flower qualities. Learn the varieties that work best at your location.
Avoid: Flowers that are fully open; those with petals that are shriveled or look transparent; stems with dry ends.
Look for: Buds no longer completely upright, in between the “pencil stage” (straight up) and the “gooseneck stage” (flower bent); membranes around buds should be open and color clearly visible.

Processing:
Unpack immediately. Remove foliage below water level. Recut stems.

Pretreatment:
If the daffodils have not been treated with an anti-ethylene product, treat them as soon as possible with EthylBloc™. Or if daffodils have been treated with an anti-ethylene product, use HydraFlor® 100 to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

There are two Floralife 100 products to consider:
1.) HydraFlor® 100: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2.) Quick Dip 100: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

NOTE: Do not initially hold daffodils in the same bucket as other flowers, especially tulips, due to a sappy secretion from fresh cut stems. Allow flowers to stand in solution by themselves at least 6 hours after recutting. Hold flowers at room temperature for 1 - 2 hours (2 - 4 if flowers are limp) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

continued
Daffodil, continued

**Storage:**
Place delphinium / larkspur in a 34 - 38°F cooler with 80 - 90% humidity.

**Cleaning:**
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.

**Troubleshooting:**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buds fail to open</td>
<td>May be due to insufficient solution uptake. Recut stems under water, use Quick Dip 100 or HydraFlor® 100 followed by a holding solution of a properly mixed Floralife Flower Food.</td>
</tr>
</tbody>
</table>
Delphinium / Larkspur

*Delphinium (Delphinium Hybrids)*
including Pacific Hybrids, Belladona Hybrids, Elatum Hybrids, Larkspur,
Annual Delphinium (*Consolida ambigua*)

**Family:** Ranunculaceae  
**Genus:** Delphinium  
**Origin:** Mediterranean area - Western Asia

**Grower Recommendations**

Delphinium / Larkspur are ethylene sensitive and benefit from an anti-ethylene product treatment such as EthylBloc™. Ethylene will cause shattering (excessive dropping) of the florets. To protect flowers from ethylene damage use an anti-ethylene product to treat flowers as soon as possible after harvest. After cutting, place Delphinium / Larkspur stems in a solution of HydraFlor® 100 for 1 hr. (or up to overnight at 34 - 38˚F). Transfer stems to a solution of one of the Floralife® 200 formulas for storage. Please contact Floralife for specifics.

**Wholesaler / Retailer Recommendations**

**Buying Tips:**
Ask: Has product been pretreated with a commercial anti-ethylene product, such as EthylBloc™ or EthylGuard? Has the product been stored and under what conditions?

**Processing:**
Rinse stems of any dirt or debris. Remove foliage below water level. Recut stems.

**Pretreatment:**
Even if delphinium / larkspur have been treated with an anti-ethylene product such as EthylBloc™, treat them again, as soon as possible. Use one of the Floralife hydration products to promote water uptake and hydration. This treatment will help decrease flower wilting and helps keep flower stems free flowing.

There are two Floralife 100 products to consider:
1.) HydraFlor® 100: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2.) Quick Dip 100: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.
Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.

Troubleshooting:
Problem: Shattering (excessive dropping of florets)
Reason/Solution: Can be caused by drying out, rough handling, old age, and/or exposure to ethylene. Check with supplier on product harvest date. Make sure a proper anti-ethylene treatment is performed, fresh flower food is used and rough handling is avoided.
Freesia

Freesia Hybrids
Family: Iridaceae
Genus: Freesia
Origin: South Africa

Grower Recommendations
Freesia are ethylene sensitive and benefit from an anti-ethylene treatment such as EthylBloc™ Technology. Ethylene will cause shattering, fading, and translucent petals of the florets. To protect flowers from ethylene damage, treat them as soon as possible after harvest. After cutting, place Freesia stems in a solution of HydraFlor® 100 hydrating treatment for 1 hr. (or up to overnight at 34 - 38°F). Transfer stems to one of the Floralife® 200 storage and transport treatments. Please contact Floralife for specifics.

Wholesaler / Retailer Recommendations

Buying Tips:
Ask: Has product been pretreated with a commercial anti-ethylene product, such as EthylBloc™? Has the product been stored and under what conditions?
Avoid: Stems with florets that easily fall off; stems with florets that are brown or shriveled.

Processing:
Rinse stems of any dirt or debris. Remove foliage below water level. Recut stems.

Pretreatment:
If freesia have not been treated with an anti-ethylene product, treat them as soon as possible with EthylBloc™. Or if freesia have been treated with an anti-ethylene product, use HydraFlor® 100 to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

There are two Floralife 100 products to consider:
1.) HydraFlor® 100: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2.) Quick Dip 100: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife  751 Thunderbolt Drive  Walterboro, SC 29488  Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

Storage:
Place freesia in a 34 - 38°F cooler with 80 - 90% humidity.

Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.
Customer Satisfaction:
Always give a packet of a Floralife Fresh Flower Food with your designs. One liter packets treat one quart of water.

Troubleshooting:
Problem: Flower fading and / or translucent
Reason / Solution: Can be caused by exposure to ethylene and / or high temperatures. Make sure that a proper antiethylene treatment is performed.

Problem: Failure of remaining florets to open
Reason / Solution: Possibly stored too long; exposed to extreme temperature or low humidity; kept out of solution for extended periods; or harvested too early. Check on harvest date and shipping / storage conditions. Make sure to recut stems under water and use a Floralife Flower Food to encourage maximum uptake.
Gerbera

Gerbera, Transvaal Daisy
Family: Compositae
Species: Gerbera jamesonii
Origin: South Africa & As

Grower Recommendations
After cutting, place gerbera stems in a solution of HydraFlor® 100 hydrating treatment for 1 hr. (or up to overnight at 34 - 38˚ F). Transfer stems to a solution of one of the Floralife® 200 formulas for storage. Please contact Floralife for specifics.

Wholesaler/Retailer Recommendations
Buying Tips:
Ask: Variety name. Different varieties have different flower qualities. Learn the varieties that work best at your location.
Avoid: Flowers with limp stems and/or petals, brown stem tips, brown centers, more than half pollen shed in center; stems that are soft / slimy in lower half inch.
Look for: Firm, straight stems and firm petals; approximately 2 rows of anthers exhibiting pollen.

Processing:
Unpack immediately to prevent wilting. Remove foliage below water level. Recut stems.

Pretreatment:
Use HydraFlor® 100 to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting. It also keeps flower stems free flowing.

There are two Floralife 100 products to consider:
1.) HydraFlor® 100 Hydrating Treatment: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2.) Quick Dip 100 Instant Hydrating Treatment: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

Storage:
Place gerbera in a 34 - 38˚ F cooler with 80 - 90% humidity. There is research that suggests that some varieties may be chill sensitive.

Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Gladiolus

**Genus:** Gladiolus  
**Family:** Iridaceae  
**Origin:** Africa

**Grower Recommendations**

Gladiolus are ethylene sensitive and benefit from an anti-ethylene treatment such as EthylBloc™ Technology. Ethylene will cause fading, wilting and translucent petals of the florets. To protect flowers from damage, treat flowers with an anti-ethylene product as soon as possible after harvest. After cutting, place flower stems in a solution of HydraFlor® 100 Hydrating Treatment for 1 hour (or up to overnight at 34-38˚ F). Transfer stems to a solution of one of the Floralife® 200 storage and transport treatment products. Please contact Floralife for specifics.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
- **Ask:** Has product been pretreated with a commercial anti-ethylene product? Has the product been stored and under what conditions?
- **Avoid:** Stems with florets that are brown or shriveled.
- **Purchase** spikes that have a few open florets.

**Processing:**
Rinse stems of any dirt or debris. Remove foliage below water level. Recut stems, preferably under clean water.

**Pretreatment:**
If gladiolus have not been treated with an anti-ethylene product, treat them with a commercial anti-ethylene product such as EthylBloc™ Technology. If the flowers have been properly treated with an anti-ethylene product, use one of Floralife’s hydration solutions to promote water uptake and hydration. This treatment will help increase bud opening, decrease flower wilting and helps keep flower stems free flowing.

There are two Floralife 100 products to consider:
1. **HydraFlor 100 Hydrating Treatment:** A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2. **Quick Dip 100 Instant Hydrating Treatment:** A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable for use in retail flower shops.

**Holding Solution:**
Hold flowers at room temperature for 1 - 2 hours (2 - 4 if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Finishing Touch hydration and protection spray over entire project.

**Storage:**
Place gerbera in a 34 - 38˚ F cooler with 80 - 90% humidity. There is research that suggests that some varieties may be chill sensitive.

continued
Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.

Troubleshooting:

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason / Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower fading and / or trasnlucent</td>
<td>Can be exposure to ethylene and /or high temperatures. Make sure that a proper antiethylene treatment is performed.</td>
</tr>
<tr>
<td>Failure of remaining florets to open</td>
<td>Possibly stored too long; exposed to extreme temperature or low humidity; kept out of solution for extended periods; or harvested too early. Check on harvest date and shipping / storage conditions. Make sure to recut stems under water and use one of Floralife's Fresh Flower Foods to encourage maximum uptake.</td>
</tr>
<tr>
<td>Petal burning</td>
<td>Gladiolus are fluoride sensitive. Water may have high concentration of fluoride. Flower food may minimize the effect.</td>
</tr>
</tbody>
</table>
Gypsophila

**Botanical Name:** Gypsophila paniculata  
**Family:** Caryophyllaceae  
**Origin:** Europe, Northern Asia  
**Pronunciation:** jip-sof-i-la pan-i-cu-LAH-ta

**Grower Recommendations**
Recommended stage of harvest is when 20-30% of flowers are open. Gypsophila are ethylene sensitive and benefit from an anti-ethylene treatment such as EthylBloc® Technology. Treat flowers with an anti-ethylene product as soon as possible after harvest. Treat with Hydraflor® 100 hydrating treatment for ½ hour to increase solution uptake and keep flowers free of stem plugging microorganisms. After cutting, place flower stems in a solution of Hydraflor® 100 hydrating treatment for 1 hour (or up to overnight at 34-38˚ F). Transfer stems to a solution of one of the Floralife® 200 storage and treatment products. Please contact Floralife for specifics.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
*Ask:* Has product been pretreated with a commercial anti-ethylene product? Use the Floralife Apple Test to make certain the product has been treated correctly. Work with grower and wholesaler to ensure flowers are treated with an anti-ethylene product.
*Avoid:* Stems with abundance of brown or shriveled flowers; stems that are black or slimy in lower portion; stems with no flowers fully open.
*Look for:* Stems with two thirds of the flowers open; flowers that have been properly precooled at grower/shipper level.

**Processing:**
Remove foliage below solution level. Recut stems.

**Pretreatment:**
If gypsophila have not been treated with an anti-ethylene product, such as EthylBloc™ Technology, treat them as soon as possible. Or if gypsophila have been treated with an anti-ethylene product, use one of Floralife’s hydration products to promote solution uptake and hydration. This treatment will help increase bud opening, decrease flower wilting and bent neck and also helps keep flower stems free flowing.

There are two Floralife® hydration products to consider:
1. Hydraflor® 100 hydrating treatment: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2. Floralife® Quick Dip 100 instant hydrating treatment: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable to retail flower shops.

**Holding Solution:**
Use fresh flower food at recommended rate: Use a Floralife® Flower Food 300 or a Floralife® 200 storage and transport treatment. To have water tested, send a plastic quart bottle of your water to Floralife, 751 Thunderbolt Drive, Walterboro, SC, 29488, Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours or longer if trying to encourage bud opening). As a finishing touch to any floral design, spray Floralife® Finishing Touch hydration and protection spray over entire project.
Gypsophila, continued

**Ethylene Sensitivity:** Flowers are highly ethylene sensitive.

**Vase Life:** 3 to 10 days depending on the cultivar, cut stage and the use of flower food.

**Storage temperature:** 34 - 36°F cooler with a 75 - 85% humidity.

**Troubleshooting:**

- **Problem:** Excessive brown flowers
  - **Reason/Solution:** May be due to exposure to ethylene, disease development, or old product. Check on product harvest date and shipping/storage conditions. Make sure anti-ethylene treatment was performed and there is good air circulation around the flowers.

- **Problem:** Failure of remaining florets to open
  - **Reason/Solution:** Can be caused by exposure to dry conditions, extended period out of water, or clogged stems. Make sure to hold in high humidity conditions. Recut stems under clean water, use Floralife® Quick Dip 100 instant hydrating treatment or HydraFlor® 100 hydrating treatment, followed by a holding solution of a properly mixed Floralife® Flower Food.

**Cleaning:**

Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**

Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Hydrangea

**Botanical Name:** Hydrangea Macrophylla
**Family:** Hydrangeaceae
**Origin:** Japan
**Pronunciation:** hy-DRAN-jee-a mac-ro-FY-la

**Grower Recommendations**
After cutting, place flower stems in a solution of HydraFlor® 100 for 1 hour (or up to overnight at 34 - 38˚ F). Transfer stems to a solution of one of Floralife® 200 storage and transport treatments. Please contact Floralife for specifics.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
Ask: What is the source of the product? What is the cultivar name? Has the product been stored dry or wet? Buy flowers that have reached maximum coloration.

**Processing:**
Remove foliage below the solution level. Recut stems under clean water. Do not leave out of solution for any extended period of time.

**Pretreatment:**
Hydrangeas have a high demand for solution. Treat with Floralife HydraFlor® 100 hydrating treatment for ½ to one hour at room temperature. HydraFlor® 100 hydrating treatment encourages water uptake and ensures proper hydration, so stems remain free flowing. Alternatively, treat with Floralife® Quick Dip 100 instant hydrating treatment. This one second dip helps to increase water uptake for all flowers. Using one of Floralife's hydrating treatments can help prevent premature wilting of hydrangeas.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1-2 hours (2-4 hours if flowers are limp or exhibiting bent neck) prior to storage in cooler or designing. As a finishing touch to any floral design, spray Floralife® Finishing Touch Finishing Spray over entire project.

**Ethylene Sensitivity:** Medium ethylene sensitivity.

**Vase Life:** 5 to 10 days.

**Storage:** 36 - 41˚ F cooler / 75 - 85% humidity.
Hydrangea, continued

Troubleshooting:
Problem: Premature wilting

Reason /Solution:
Product may have been stored too long, improperly kept out of solution for an extended period. Recut under clean water and make sure a hydrating treatment is used; check on storage conditions; make sure Floralife® Flower Food 300 is used.

Cleaning:
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
**Iris**

**Botanical Name:** Iris X hollandica
**Family:** Iridaceae
**Origin:** Iberian Peninsula & Northern Africa
**Pronunciation:**

**Grower Recommendations**
Recommended stage of harvest is at the ‘pencil tip’ stage when a line of color projects out of the sheathing leaves. Use FloraLife HydraFlor® 100 hydrating treatment for cut flowers for 1/2 hour immediately after harvest and then transfer flowers into a properly mixed solution of FloraLife® 200 storage and transport treatment or FloraLife® Flower Food 300.

**Wholesaler / Retailer Recommendations**

**Buying Tips:**
- **Ask:** Variety name. Different varieties have different flower qualities. Learn the varieties that work best at your location.
- **Avoid:** Flowers with brown petal tips and unopened flowers that feel soft.
- **Look for:** Flowers in the ‘pencil’ stage, showing color or just starting to open.

**Processing:**
Unpack immediately so product is not allowed to dry out. Remove foliage below solution level. Recut stems. Remove lower foliage.

**Pretreatment:**
Use FloraLife’s HydraFlor® 100 hydration pretreatment for to promote water uptake and hydration. This treatment will help increase bud opening and decrease flower wilting and bent neck, and also keeps flower stems free flowing.

There are two FloraLife® hydration products to consider:
1. HydraFlor® 100 pretreatment: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2. FloraLife® Quick Dip pretreatment: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable to retail flower shops.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
FloraLife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours if you want them to open soon, prior to storage in cooler or designing. As a finishing touch to any floral design, spray FloraLife® Finishing Touch hydration and protection spray.
Ethylene Sensitivity: Low ethylene sensitivity.

Vase life: 3 to 10 days.

Storage Temperature: 34 - 36°F cooler / 75 - 85% humidity.

Troubleshooting:
Problem: Yellow foliage
Reason / Solution: Can be due to production conditions, old product, improper storage conditions, or extended period out of solution. Check on previous handling conditions and age of product. Do not allow Iris to dry out and utilize Floralife® Bulb Food.

Problem: Buds fail to open
Reason / Solution: May be due to insufficient solution uptake. Recut stems under water, use Hydratior® 100 followed by a holding solution of a properly mixed Floralife® Bulb Food.

Problem: Drying out of flowers and foliage
Reason / Solution: Can be due to improper storage or extended period out of solution. Make sure flowers are not kept dry for long periods. Hold in high humidity (75 - 80%).

Cleaning:
Use D.C.D. Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:
Always give a packet of a FloraLife Fresh Flower Food with your designs. One liter packets treat one quart of water.
Lisianthus

**Botanical Name:** Eustoma grandiflorum  
**Family:** Gentianaceae  
**Origin:** New Mexico, Japan, North America  
**Pronunciation:** yew-STO-ma-grand-i-FLOR-um

**Grower Recommendations**
Harvest when at least 2 flowers are open. There is literature that suggests the use of an anti-ethlene product such as EthylBloc™ Technology helps to open more flowers. After cutting, place flower stems in a solution of FloraLife® HydraFlor® 100 hydrating treatment for 1 hour (or up to overnight at 34 - 38˚ F). Transfer stems to a solution of FloraLife® 200 storage and transport treatments. Please contact FloraLife for specifics.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
Ask: Has product been pretreated with an anti-ethylene product, such as EthylBloc™ Technology? What is the source of the product? What is the cultivar name? Has the product been stored dry or wet?
- Do not buy flowers which have leaf yellowing.
- Buy flower stems that have 1 - 3 blooms open.

**Processing:**
Remove foliage below solution level. Recut stems.

**Pretreatment:**
If already treated with an anti-ethylene product, such as EthylBloc® Technology, you can use FloraLife® Hydraflor® 100 hydrating treatment for ½ to 1 hour at room temperature, depending on variety. Hydraflor® 100 encourages water uptake and ensures proper hydration, so lisianthus quickly become firm and stems remain free flowing. This is especially important for very dehydrated lisianthus. Alternatively, treat with FloraLife® Quick Dip 100 hydrating treatment under normal conditions. This one second dip helps to increase water uptake for all flowers. Using one of FloraLife’s hydration pretreatments can help prevent dehydration of lisianthus.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to: FloraLife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 hours if flowers are limp or exhibiting bent neck) if you want them to open prior to storage in cooler or designing. As a finishing touch to any floral design, spray FloraLife® Finishing Touch hydration and protection spray over entire project.

*continued*
Lisianthus, continued

**Ethylene Sensitivity:**  Slightly ethylene sensitive (varies depending on cultivar).

**Vase Life:**  10 to 14 days.

**Storage:**  36 - 41°F cooler / 75 - 85% humidity.

**Troubleshooting:**

**Problem:** Buds fail to open

**Reason / Solution:** Product may have been stored too long, improperly kept out of solution for an extended period or exposed to ethylene. Make sure an anti-ethylene pretreatment is used; check on storage conditions; make sure a Floralife® Flower Food is used.

**Problem:** Flower fading

**Reason / Solution:** Make sure that a Floralife® Fresh Flower Food is being used correctly. Using flower food enhances the flower color. Low intensity light may also fade colors.

**Cleaning:**

Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**

Always give a packet of a Floralife® Flower Food with your designs. One liter packets treat one quart of water.
Dendrobium Orchid

Botanical Name: *Dendrobium* spp.
Common Name: Dendrobium Orchid
Pronunciation: den-DRO-bee-um
Family: Orchidaceae
Origin: Native to Asia, Australia and the Pacific Islands

**Grower Recommendations**
Recommended stage of harvest is when 30 - 40% of the florets are open. Dendrobium are ethylene sensitive and benefit from an anti-ethylene product treatment such as EthylBloc™. To protect flowers from ethylene damage use an anti-ethylene product to treat flowers as soon as possible after harvest. After cutting, place stems in a solution of HydraFlor® 100 for 1 hr. or with Quick Dip 100 instant hydrating treatment. Transfer stems to a solution of one of the Floralife® 200 formulas for storage and transport. Please contact Floralife for specifics.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
Purchase sprays that have the majority of the florets developed. Look for turgid flowers that are free of discoloration, spotting and brown tips

**Processing:**
Wholesaler: Check tubes to make sure they are full of solution and sprays are turgid. If sprays are limp, follow directions below.
Retailer: Unpack immediately. Recut under clean water and process with a Floralife hydration solution according to label directions (Hydraflor® 100 or Quick Dip 100). Place in a Floralife flower food solution.

**Temperature:**
Dendrobium orchids are chill sensitive and should be stored at temperatures above 55° F / 12.8° C with 80 - 90% humidity.

**Customer Satisfaction:**
Always give a packet of a Floralife Fresh Flower Food with your designs. One liter packets treat one quart of water.

**Troubleshooting:**

**Problem:**
Limp, droopy sprays

Florets are transparent, have dry patches or are discolored. Floret abscission (drop).

**Reason / Solution:**
Can be caused by stem plugging / blockage causing a hydration problem. Recut stems under clean water and use a Floralife hydration solution followed by a Floralife fresh flower food solution.

Chilling injury or ethylene gas damage. Store at temperatures above 55° F / 12.8° C. Treat with EthylBloc™ Technology.
**Queen Anne’s Lace**

**Botanical Name:** Daucus carota  
**Family:** Apioideae or Umbelliferae  
**Origin:** Europe, N. Africa, Asia  
**Pronunciation:** DAU-cuska-ROT-a

**Grower Recommendations**
Remove bottom foliage. Process flowers with Floralife® Hydraflor® 100 hydrating treatment or Floralife® Quick Dip 100 instant hydrating treatment according to label directions and a Floralife® Flower Food 300 solution. Flowers are ethylene sensitive. Treat with EthylBloc™ Technology for a transport care treatment.

**Wholesaler/Retailer Recommendations**

**Buying Tips:** Purchase bunches that are turgid and not shedding petals.

**Processing:**
Process flowers with Floralife® Hydraflor® 100 hydrating treatment or Floralife® Quick Dip 100 instant hydrating treatment according to label directions and a Floralife® Flower Food 300 solution. Flowers are ethylene sensitive. Treat with EthylBloc™ Technology for a transport care treatment.

**Ethylene Sensitivity:** Flowers are ethylene sensitive.

**Vase Life:** 3 to 7 days.

**Storage:** 34 - 36˚ F cooler / 75 - 80% humidity.

**Troubleshooting:**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limp, droopy blooms</td>
<td>Queen Anne’s Lace stems can easily become water stressed. Recut stems under clean water and use a Floralife hydrating treatment followed by a Floralife® Flower Food solution.</td>
</tr>
<tr>
<td>Petal and flower fall (abscission)</td>
<td>This can be caused by ethylene damage and/or water stress. Treat with EthylBloc™ Technology.</td>
</tr>
</tbody>
</table>

**Cleaning:**
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Botanical Name: *Rosa hybrida*
Family: Rosaceae
Origin: Temperate Northern Hemisphere
Pronunciation: ROW-za

**Grower Recommendations**
Growers should treat roses with a hydration product, especially if roses are shipped dry pack. For a majority of growers, use Floralife® HydraFlor® 100 hydrating treatment immediately after harvest and through grading. Treatment time will vary with temperature and storage conditions. Please contact Floralife to discuss your particular environment. When roses are shipped through mass markets or other high ethylene conditions, use anti-ethylene products, such as EthylBloc™ Technology. Always use one of Floralife® 200 storage and transport treatment products when storing and / or shipping roses “wet” (i.e., in solution).

**Wholesaler/Retailer Recommendations**

**Buying Tips:**
Ask: Variety name. Different varieties have different flower qualities. Learn the varieties that work best at your location.
Avoid: Fully opened flowers; limp stems and/or soft flowers; damaged or diseased foliage; flower heads with mold.
Look for: Flowers with firm stems, foliage and flowers.

**Processing:**
Unpack immediately. Remove foliage below solution level. Recut stems.

**Pretreatment:**
Floralife® HydraFlor® 100 for ½ hour – 1 hour at room temperature, depending on variety. Hydraflor® 100 hydration solution encourages water uptake and ensures proper hydration, so roses quickly become firm and stems remain free flowing. This is especially important for very dehydrated roses or before a major rose holiday. Alternatively, treat with Floralife® Quick Dip 100 hydration solution under normal conditions. This one second dip helps to increase water uptake for all flowers. Using one of Floralife’s hydration pretreatments can help prevent bent neck in roses.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Place roses immediately in the cooler to prevent opening. Roses can hydrate in the cooler in a few hours. As a finishing touch to any floral design, spray Floralife® Finishing Touch hydration and protection spray over entire project.

*continued*
Ethylene Sensitivity: Some rose varieties, if exposed to ethylene conditions, will benefit from an anti-ethylene treatment. Ethylene sensitivity varies with rose variety. Test your roses using the Floralife Apple Test to see if there are benefits from an anti-ethylene product treatment, such as EthylBloc™ Technology. If benefit of treatment is seen, ask your grower for anti-ethylene treated roses or treat yourself.

Vase Life: 4 to 16 days depending on the cultivar and postharvest care.

Storage: 34 - 36˚ F cooler / 75 - 85% humidity.

Troubleshooting:

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buds fail to open</td>
<td>Possibly harvested too early; had extended period out of water; extended storage; exposure to temperature or humidity extremes; high microbe growth or incorrect use of fresh flower food type or amount. Consult your wholesaler or grower. Recutting stems under water, using Floralife Hydraflor® 100 hydrating treatment or Floralife® Quick Dip 100 instant hydrating treatment and one of Floralife’s Flower Foods may correct the problem.</td>
</tr>
<tr>
<td>Premature bent neck</td>
<td>Can be due to extended period out of water; exposure to high temperature or low humidity; exposure to ethylene; high microbe growth or incorrect use of fresh flower food type or amount. Recut stems under clean water, use Floralife® Hydraflor® 100 or Floralife® Quick Dip hydration solution and one of Floralife’s Flower Foods.</td>
</tr>
<tr>
<td>Frequent petal burning</td>
<td>Can be due to production problems, fresh flower food not matching water quality or not used at proper concentration, or flowers in treatment for extended period. Make sure to use the correct Floralife® blend and amount.</td>
</tr>
<tr>
<td>Improper opening</td>
<td>Can be ethylene exposure; treat with EthylBloc™ Technology.</td>
</tr>
</tbody>
</table>

Cleaning: Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction: Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Botanical Name: Antirrhinum majus  
Family: Scrophulariaceae  
Origin: Southwestern Europe and Mediterranean region  
Pronunciation: anti-RYE-num MAY-jus

Grower Recommendations
Snapdragons are ethylene sensitive. They benefit from an ethylene-action inhibitor, such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as soon as possible after harvest. After cutting, place flower stems in a solution of Floralife® HydraFlor® 100 hydrating treatment for 1 hour (or up to overnight at 34 - 36˚F). Transfer stems to a solution of one of Floralife’s 200 products for storage and transport. Please contact Floralife for specifics.

Wholesaler/Retailer Recommendations
Buying Tips:
Ask: Has product been treated with an ethylene-action inhibitor, such as EthylBloc™ Technology? What is the source of the product? What is the cultivar name? Has the product been stored wet or dry?

Buy flowers that have about 1/3 - 1/2 florets open.

Processing: Remove foliage from lower 1/3 portion of spike. Leave the rest of the foliage on the stem. Recut stems.

Pretreatment:
Even if the snapdragons have been treated with an ethylene-action inhibitor, treat them again as soon as possible. Being multi-floreted stems, snapdragons benefit from multiple treatments. Blooms that were not showing color during the previous treatment were not protected. Utilize Floralife Hydraflor® 100 hydrating treatment or Floralife® Quick Dip instant hydrating treatment prior to placing in a flower food solution. Use one of Floralife’s Flower Foods (see Holding Solution) to promote water uptake and hydration. This treatment will help increase bud opening, decrease flower wilting and fresh flower food keeps flower stems free flowing.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to: Floralife  |  751 Thunderbolt Drive  |  Walterboro, SC 29488  |  Attn: Laboratory.

Flowers can be placed immediately in the cooler to prevent flower opening. Let the flowers hydrate in the flower food solution 1 - 2 hours before designing with them. As a finishing touch to any floral design, spray Floralife® Finishing Touch® hydration and protection spray over entire project.

continued
Snapdragon, continued

Ethylene Sensitivity: High. (Most snapdragon cultivars are sensitive to ethylene.)

Vase Life: 5 to 10 days.

Storage: 34 - 36˚ F cooler / 75 - 85% humidity.

Troubleshooting:

Problem: Floret color fading  
Reason/Solution: Make sure to use Floralife® Fresh Flower Food at the right dose. Store with some light exposure.

Problem: Buds fail to open  
Reason/Solution: Product may have been stored too long, improperly kept out of solution for an extended period or exposed to ethylene. Make sure an anti-ethylene treatment is used; check storage conditions; make sure a Floralife® Flower Food solution is used.

Problem: Abscission (flower fall), translucent flowers and petals  
Reason/Solution: Make sure an anti-ethylene pretreatment is performed and that one of Floralife’s Flower Foods is used. Change varieties if problem continues.

Problem: Do not know if flowers were treated with an anti-ethylene product and/or treated properly  
Reason/Solution: Use the “Apple Test” to check for proper anti-ethylene treatment.

Problem: Curving of the stem  
Reason/Solution: Flower stems are geotropic. Subtle curving of the stem is not unusual; however, extreme bending will occur rapidly when in a horizontal position – store in a vertical position.

Cleaning:

Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

Customer Satisfaction:

Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
**Statice**

**Botanical Name:** Limonium sinuatum  
**Family:** Plumbaginaceae  
**Origin:** Mediterranean region  
**Pronunciation:** li-MON-ee-um sin-yew-AH-tum

**Grower Recommendations**  
Use Floracal® Quick Dip 100 instant hydrating treatment or HydraFlor® 100 hydrating treatment in field or packing shed immediately after harvest before placing into one of Floracal’s Flower Food 300 solutions or Floracal® 200 storage and transport treatment products.

**Wholesaler/Retailer Recommendations**  
**Buying Tips:**  
**Avoid:** Flowers or stems with signs of mildew, brown spots or rotting leaves.  
**Look for:** Flowers with straight firm stems and bright green foliage.

**Processing:** Recut stems. Removed damaged parts and as much lower foliage as possible.

**Pretreatment:**  
Floracal® Quick Dip 100 instant hydrating treatment followed by placing into fresh flower food.

**Holding Solution:**  
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:  
Floracal | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Flowers can be placed immediately in the cooler to prevent flower opening. Let the flowers hydrate in the flower food solution 1 - 2 hours before designing with them. As a finishing touch to any floral design, spray Floracal® Finishing Touch hydration and protection spray over entire project.

**Ethylene Sensitivity:** Medium

**Vase Life:** 4 to 14 days

**Storage:** 34 - 36°F cooler / 75 - 85% humidity.
## Troubleshooting:

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason / Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold develops</td>
<td>Disease develops due to excess free water present during storage and shipping.</td>
</tr>
<tr>
<td></td>
<td>Treatment at grower level which allowed water to sit on flowers and foliage</td>
</tr>
<tr>
<td></td>
<td>for an extended period.</td>
</tr>
<tr>
<td>Excess yellow foliage</td>
<td>Can be due to production conditions, old product, improper storage</td>
</tr>
<tr>
<td></td>
<td>conditions, or extended period out of solution. Check on previous handling</td>
</tr>
<tr>
<td></td>
<td>conditions and age of product. Do not allow to dry out.</td>
</tr>
<tr>
<td></td>
<td>Use Floralife Hydratior® 100 hydrating treatment or Floralife® Quick Dip 100</td>
</tr>
<tr>
<td></td>
<td>instant hydrating treatment and correct Floralife® Flower Food solution and amount.</td>
</tr>
</tbody>
</table>

### Cleaning:

Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

### Customer Satisfaction:

Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Botanical Name: 
Matthiola incana

Family: 
Brassicaceae or Cruciferae

Origin: 
Mediterranean region

Pronunciation: 
stah-k

Grower Recommendations
Stock are ethylene sensitive. They benefit from an ethylene-action inhibitor such as EthylBloc™ Technology. To protect flowers from ethylene damage, treat them as soon as possible after harvest. After cutting, place flower stems in a solution of Hydratior® 100 hydrating treatment for one hour (or up to overnight at 34 - 36˚ F). Transfer stems to a solution of one of Floralife® 200 storage and transport products. Contact Floralife for specifics.

Wholesaler/Retailer Recommendations
Buying Tips:
Ask: Has product been pretreated with an anti-ethylene-action inhibitor product, such as EthylBloc® Technology? What is the source of the product? What is the cultivar name? Has the product been stored dry or wet?

Do not buy flowers that have leaf yellowing.

Buy stems that have at least 6 open florets.

Processing: Remove foliage below solution level. Recut stems.

Pretreatment:
Even if the stock has been treated with an anti-ethylene product such as EthylBloc™ Technology, treat them again as soon as possible. Use one of Floralife's Flower Foods (see Holding Solution) to promote water uptake and hydration. This treatment will help increase bud opening, decrease flower wilting and fresh flower food keeps flower stems free flowing.

Holding Solution:
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife I 751 Thunderbolt Drive I Walterboro, SC 29488 I Attn: Laboratory.

As a finishing touch to any floral design, spray Floralife® Finishing Touch hydration and protection spray over entire project.

Ethylene Sensitivity: Medium

Vase Life: 5 to 8 days.
**Troubleshooting:**

**Problem:**
Yellowing foliage

**Reason / Solution:**
Can be due to variety selection, grower practice or improper storage. Grow or purchase those that do not turn yellow as easily.

Abscission (flower fall), translucent flowers and petals

**Reason / Solution:**
Make sure an ethylene-action inhibitor pretreatment is performed and that one of Floralife’s flower foods is used. Change varieties if the problem continues.

Do not know if flowers were treated with an ethylene-action inhibitor product and / or treated properly

**Reason / Solution:**
Use the Floralife “Apple Test” to check for proper anti-ethylene treatment.

**Cleaning:**
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Sunflower

**Botanical Name:** Helianthus annuus  
**Family:** Asteraceae or Compositae  
**Origin:** Midwest and Western U.S.  
**Pronunciation:**

**Grower Recommendations**
There is literature that suggests sunflowers are ethylene sensitive and would benefit from the use of an ethylene-action inhibitor, such as EthylBloc™ Technology. Use Floralife’s Hydraflor® 100 hydrating treatment for 1 - 2 hours (room temperature) immediately after harvest or overnight in a cooler. Transfer flowers into a holding solution of a properly mixed Floralife® Flower Food 300 or Floralife® 200 storage and transport treatment products. The flowers are then ready for shipment / storage.

**Wholesaler/Retailer Recommendations**

**Buying Tips:**  
Sunflowers should be open upon purchase (pollen should be visible).

Avoid flowers with yellow or dried leaves.

**Processing:** Unpack immediately. Remove foliage below the solution level. Recut stems.

**Pretreatment:**
If sunflowers have not been treated with an ethylene-action inhibitor such as EthylBloc® Technology, treat them as soon as possible. Use one of Floralife’s Flower Foods (see Holding Solution) to promote water uptake and hydration. This treatment will help increase bud opening, decrease flower wilting and fresh flower food keeps flower stems free flowing.

There are two Floralife® hydration products to consider:
1. Hydraflor® 100 hydrating treatment: A concentrate, generally recommended for maximum results, especially with hard-to-hydrate flowers like roses. The treatment is usually for one half hour at room temperature.
2. Floralife® Quick Dip 100 instant hydrating treatment: A ready-to-use version which requires no mixing or measuring. This quick one second dip may be more suitable to retail flower shops.

Flowers should then be placed into a holding solution of a Floralife® flower food.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
Floralife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours prior to storage in cooler or designing. As a finishing touch to any floral design, spray Floralife® Finishing Touch hydration and protection spray over entire project.

continued
Sunflower, continued

**Ethylene Sensitivity:** Varies depending on the cultivar. Some cultivars are ethylene sensitive.

**Vase Life:** 5 to 14 days depending on the cultivar and postharvest care.

**Storage Temperature:** 34 - 36˚ F cooler / 75 - 85% humidity.

**Troubleshooting:**

**Problem:** Leaf Yellowing  
**Reason / Solution:**  
May be due to age of flower or improper storage and handling. Flower will last longer than the foliage: as foliage dies remove the leaves.

**Problem:** Bent neck  
**Reason / Solution:**  
May be due to improper stage of harvest, or flower may be dehydrated. Recut the stem under water and hydrate the flower (see above section on “Hydration”), then place in Floralife® flower food.

**Cleaning:**  
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**  
Always give a packet of a Floralife Flower Food with your designs. One liter packets treat one quart of water.
Botanical Name: *Tulipa gesnerana*
Family: *Liliaceae*
Origin: Turkey, Southern Russia
Pronunciation: 'toolip

**Grower Recommendations**
The recommended stage of harvest is when buds are just showing color. Our recommendation is to ship flowers dry and cool. If shipped in a solution, use FloraLife's Hydraflo® 100 hydrating treatment for ½ hour immediately after harvest and then transfer flowers into a properly mixed solution of FloraLife® 200 storage and transport solution. If tulips are going to be stored dry, best results are obtained when flowers are stored vertically, with bulbs on, at 33 - 36°F.

**Wholesaler/Retailer Recommendations**
**Buying Tips:**
Ask variety name. Different varieties have different flower qualities. Perform a simple vase life test to determine which varieties tend to last longer and are more disease resistant.

Request the specific cut stage from grower.

Look for flowers just beginning to show color.

**Processing:**
Unpack immediately. Wash soil and sand off stems. Recut stems. Cut off white fleshy basal portion of stem. Use clean cutting tools.

**Pretreatment:**
Use FloraLife Hydraflo® 100 hydrating treatment for ½ hour at room temperature (see below) to promote water uptake and ensure proper hydration, so that tulips become firm and stems remain free flowing. FloraLife® PAL 100 treatment can be added to hydration solution to help with healthy foliage.

**Holding Solution:**
Use fresh flower food at the recommended rate: Use Flower Food 300, 200, Clear 200, or Clear ULTRA 200 storage and transport treatments, or depending on water test results, Special Blend 300 for Hard Water or for Pure Water.

To have water tested, send a plastic quart bottle of your water to:
FloraLife | 751 Thunderbolt Drive | Walterboro, SC 29488 | Attn: Laboratory.

Hold flowers at room temperature for 1 - 2 hours (2 - 4 if flowers are limp) prior to storage in cooler or designing. Keep stems wrapped in paper or plastic sleeves to keep stems upright. Avoid excess moisture on flower heads and stems as this may contribute to the growth of *Botrytis*. Cutting a slit just below the flower head in the tulip stem has not been proven to keep the flower from opening.
Specific Crop Treatments

**Tulip, continued**

**Ethylene Sensitivity:** Tulip flowers are not generally ethylene sensitive.

**Vase Life:** 3 to 10 days depending on the cultivar, cut stage and the use of flower food.

**Storage Temperature:** 34 - 36˚ F cooler / 75 - 85% humidity.

**Troubleshooting:**

**Problem:**
- Flowers “blow” open too quickly.
- Stems continue to “grow” (elate) after harvest.

**Reason / Solution:**
- Likely due to being held at warm temperatures. Hold at 34-36˚ F.
- If displaying outside cooler, try to hold at a cool temperature at night.
- Also, there are different varieties that “blow” open more quickly than others.
- Keep flowers at the cool temperature listed above. Try to insert tulips into arrangements at the latest time possible or place them deeper into the design.

**Experimental Data: Vase Life of 3 Cultivars of Tulips**

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Vase Life (days)</th>
<th>Water</th>
<th>Floralife Bulb Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barcelona</td>
<td>6.4</td>
<td>6.2</td>
<td>8.2</td>
</tr>
<tr>
<td>Transavia</td>
<td>6.0</td>
<td>6.2</td>
<td>8.2</td>
</tr>
<tr>
<td>Rosario</td>
<td>6.1</td>
<td>6.1</td>
<td>7.4</td>
</tr>
</tbody>
</table>

**Cleaning:**
Use D.C.D.® Cleaner Solution to clean buckets, vases, coolers, etc. D.C.D.® is specifically formulated to kill microbes over an extended period.

**Customer Satisfaction:**
Always give a packet of a Floralife® Flower Food with your designs. One liter packets treat one quart of water.