handle with care

By Bruce Wright

Take action against ethylene—and see how much longer your flowers last.

UNLESS YOU'RE BRAND NEW to the flower business, you probably know what ethylene is. It's a gas, odorless and invisible, that is produced by flowers and plants as part of their natural life cycle. It's also present in everyday life from non-natural sources, including combustion engines, propane heaters, cigarette smoke, and even fluorescent lamps. Plants produce ethylene the way our own bodies produce certain hormones that stimulate normal life processes of maturation and development. Ethylene happens to stimulate ripening, wilting, and decay.

About 30% of "shrink" (the loss of cut-flower inventory due to premature damage and death) can be attributed to ethylene, according to the U.S. Department of Agriculture, as quoted on the Floralife website (**www.floralife.com**). Symptoms of ethylene exposure in cut flowers include droopy stems, shattered blossoms, shriveled petals and yellow leaves. Not all, but many commercial cut flowers and plants are susceptible (see the list on page 26). Ethylene works its mischief in very low concentrations—in parts per billion.

Despite widespread awareness of the damage caused by ethylene, many florists—and growers and wholesalers and shippers—don't do as much about it as they could. Perhaps that's because ethylene damage looks much like normal cut-flower aging and decay—except that it's preventable.

By contrast, with proper precautions against ethylene, flower life can be extended by anywhere from a third again to three times as long, depending on the variety. Buds are more likely to open. And flowers treated against ethylene are also less vulnerable to disease and infections like botrytis mold.

Not only cut flowers but also blooming and green plants and cut foliage can benefit from protection against ethylene. Well-known examples include kalanchoes, begonias, Christmas cactus, many orchids, and tree fern.

To start, buy smart

The first thing you can do to guard against ethylene damage is to buy your flowers from reputable wholesalers and growers who will have treated them responsibly all along the way. Good growers treat their ethylene-sensitive crops with either STS (silver thiosulfate, known commercially as AVB) or MCP (1-methylcyclopropene, also known as EthylBloc® or Ethylene Buster).

STS is given to cut flowers as part of their first drink after harvest. The systemic treatment protects against ethylene from both internal and external sources—that is, ethylene produced by the flower itself, and ethylene produced from other sources in the environment, including other flowers. While the use of STS with certain crops is common, it can never be taken for granted; it's always a good idea to ask.

MCP is administered as a powder that, mixed with water, turns into a gas. The gas is released into the air in a closed environment with flowers and plants. It then binds to the receptor sites where these flowers and plants would otherwise bind to ethylene, effectively "blocking" the ethylene from damaging the plant or flower. Because of the way they are administered, MCP products may be used to protect plants as well as cut flowers and foliage, and they can be used by wholesalers and retailers as well as by growers. As the plant or flower develops and grows new receptor sites, fresh treatments may be beneficial.

Keeping flowers properly chilled, which is helpful for so many other reasons, also helps to protect them from ethylene—which is yet another reason to pick suppliers who are scrupulous about maintaining the cold chain.

And of course, the most advanced and knowledgeable suppliers can offer you flowers and varieties that have been bred to minimize ethylene sensitivity in the first place.

Go to the source(s)

The next line of defense is to remove or minimize sources of ethylene in the shop. Some of the most common sources are:

Produce. Not all produce is ethylene producing: citrus fruits, for example, are relatively safe. But there is danger from a long list of fruits, among them apples, pears, ripe kiwi fruit, certain stone fruits (apricots, nectarines) and melons (cantaloupe, honeydew). Don't store these fruits in the floral cooler (not even in your lunch box). It goes without saying that, in gift baskets and other floral designs that combine these fruits with ethylene-sensitive flowers, the flowers are at risk. This is a good reason for substituting realistic artificial apples and pears for real ones in your holiday designs. Added to a fruit basket, an orchid plant probably won't last as long as it should.

Mechanical damage. When a flower is wounded—if you break the stem, or bruise a petal or leaf—it will emit ethylene as a stress response. Here's one more reason to be gentle with flowers. Avoid dropping boxes of flowers roughly onto tables or floors. In processing, if a lateral branch snaps off by accident, don't leave a ragged edge, but give it a nice clean cut; if the main stem breaks, be sure to remove it from the bunch. Carefully remove damaged leaves and petals. Otherwise, leave foliage on the stem (except for leaves that will be below the waterline), and refrain from peeling rose petals heartlessly until you can see what's truly necessary for the design.

Smoke and exhaust. Everyone knows that combustion engines release ethylene. "Still, many florists will back the delivery vehicle right up to the back door and leave it running while they load it," notes Gay Smith, technical consulting manager at Chrysal Americas, "especially if they live in a cold climate." Cigarette smoke is another danger—even the

Carnations are often mentioned as a flower that is known to be ethylene-sensitive. In this photo from Floralife, it's evident how much a bunch of white mini-carnations has benefited, after 10 days, from treatments with EthylBloc® (the middle vase) and with STS (the vase on the far right).

little bit that smokers exhale as they come back into the workroom from a break in the parking lot. Remember that ethylene wreaks havoc even when it is present in very small amounts. Smoking in the delivery van is, of course, out of the question—no matter how much the driver thinks he needs it.

Bacteria, yeast and fungi. Besides clogging stems, bacteria and other microorganisms also emit ethylene—another reason to keep areas where flowers and plants are held and processed scrupulously clean and sanitized.

Treatments and filters

All the precautions mentioned so far are the best and most important things you can do to protect against ethylene. We've already referred to EthylBloc®, which is effective at every level of the distribution chain, easy to administer in any enclosed area, and harmless to animals and humans.

Also available on the market are ethylene scrubbers or filters. Among the best-known type of filter is the kind sold by Ethylene Control in Selma, California. These filters work by means of a chemical contained within purple pellets. The chemical ("nascent oxygen") reacts with ethylene, "oxidizing" it and rendering it harmless. Over time, the pellets turn brown, from the inside out, and eventually they can be removed and used as organic fertilizer. The filters come in different packaging designed for different applications: sachets for shipping boxes and for small, reach-in coolers; filters for floral walk-in coolers and large reach-ins; and filtration systems for the largest cold-storage rooms. For greater efficiency in a larger space, the filters are hung in such a way that they intercept the airflow from the cooler fan.

Day to day, it's easy to forget about the invisible enemy ethylene and its insidious effects—but once you've waged an anti-ethylene campaign, you'll be thrilled with the extra life and beauty you get from your flowers.

For more information, visit:
www.chainoflifenetwork.org
www.chrysalusa.com
www.ethylenecontrol.com
www.floralife.com

A partial list of ethylene-sensitive flowers

- Achillea (yarrow)
- Aconitum (monkshood)
- Agapanthus
- Allium
- Alstroemeria
- Bouvardia
- Campanula
- Carnation
- Celosia
- Cornflower
- Cymbidium
- Crocosmia
- Delphinium
- Dendrobium
- Eremurus
- Freesia
- Gladiolus
- Gypsophila
- Ixia
- Larkspur
- Lily
- Limonium
- Lisianthus
- Lysimachia
- Orchids (some)
- Phlox
- Queen Anne's lace
- Ranunculus
- Rose (some varieties)
- Scabiosa
- Snapdragon
- Solidaster
- Stock
- Sunflower
- Sweet Pea
- Sweet William
- Trachelium
- Veronica
- Wax Flower