By Arthur Cameron

Thanks to their lightweight, versatile nature, plastics have found a multitude of uses in crop production and landscaping. Around the world, millions of tons of plastic are used each year to cover greenhouses, make containers and plug flats, and even mulch vegetable row crops. However, the fate of plastic in our environment is a serious issue.

Our “green” industry has not always been so green when it comes to reusing and recycling the vast quantity of plastic generated. Landfills are not an appropriate option, and unless it’s stringently controlled, burning can release potentially dangerous compounds into the atmosphere. Containers can be reused, but there are issues related to sorting, cleaning and disease control. Greenhouse coverings and mulch films cannot be reused because they deteriorate under UV radiation. Plus, horticultural plastics get dirty.

Several different types of plastic are used in the horticultural industry, including low-density polyethylene, high-density polyethylene, polypropylene and high-impact polystyrene (see sidebar on page 24). To maintain the highest quality of the recycled product, these need to be carefully sorted and handled separately. And even when properly sorted, various contaminants including soil and organic matter reduce the quality of recycled plastic compared to virgin material.

Every time plastic goes through the recycling process, contaminants and structural degradation reduce the quality of the plastic, such that it may become more difficult to remanufacture the same product.

The Good News

The good news is that there seems to be an ever-expanding number of opportunities for recycling horticultural plastic. Not long ago, plastic was thrown into landfills or even shipped away to places like China. Now, there are even cities that collect horticulture plastic curbside, a trend that would be great to see all over the country. Prices for recycled plastic are improving after a drop last year, and there is more interest from the plastic recycling companies to learn how to collect, sort, clean, grind and sell horticultural plastics. It seems to be getting easier to find companies willing to partner with community organizations for recycling events. Some states, such as New Jersey, have developed programs to facilitate the collection of greenhouse plastics. Some professional horticulture groups, including the Minnesota Nursery & Landscape Association, have developed programs to collect plastic, and some retailers — both big boxes and independent garden centers — have initiated programs to collect and recycle plastic containers and trays from gardeners. All of this is good news.

One of the most successful recycling programs in the country for horticulture pots and trays was developed by Steve Cline at the Missouri Botanic Gardens. He has teamed with local retailers and recyclers to develop a model program that is the envy of everyone who’s seen it. There are several drop-off points in Greater St. Louis, and the collected plastic is transported...
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Today, growers, garden centers, nurseries and home gardeners have more recycling/reuse options available for efficient and sustainable plastics disposal.
Plastics Used in Horticulture

High-Density Polyethylene

**Uses:** HDPE is commonly used in nursery containers, specifically those used outdoors for trees and shrubs. Outside of agriculture, the most important use for HDPE plastic is for milk containers manufactured through the process of blow molding. HDPE is also used to manufacture fuel tanks for vehicles, various other screw-top containers and some types of irrigation pipes. HDPE resists breakage and does not break down quickly under UV light. It is both thermally and chemically resistant and thus has been extensively used for containing pesticidal and herbicidal chemicals.

**Reusing and Recycling:** HDPE-constructed plant containers can be reused, but it is best to sterilize them. Thielaviopsis black root rot spores can persist in containers and infect subsequent crops of susceptible species. Still, some growers have reused containers and have avoided problems to date. Evergreen Acres Nursery near Spring Lake, Mich., reused 20,000 pots that customers returned. They cleaned and sorted the used pots and potted up perennials that were not impacted by Thielaviopsis black root rot.

Major recycling of HDPE is typically devoted to milk containers. Because dirt and other contaminants can reduce the value of timber if not completely eliminated, growers may have to find plastic recycling companies that are willing to accept, wash and grind nursery containers. Recycled HDPE is typically not reformed into containers, but rather is made into plastic timber or greenhouse liners. Compared to wood, plastic timber can be very heavy, but it’s becoming more popular each year.

Low-Density Polyethylene

**Uses:** LDPE, a relatively inexpensive plastic, is used extensively to cover greenhouses and has proven effective as a mulching material for diverse food and ornamental crops such as strawberries, vegetables and even herbaceous perennial plants. It is also commonly used for plastic bags.

**Reusing and Recycling:** LDPE greenhouse films cannot typically be reused. When used as a plastic mulch, trapped soil greatly hampers recycling. Some plastic recycling companies specialize in developing wash line systems for cleaning these plastics, and a wide range of specialized systems have been developed. Still, washing is an extra cost and many plastic recyclers do not have this equipment, which reduces the number of options available to growers.

When used as a greenhouse cover, LDPE films break down from UV radiation, which limits its usefulness when recycled. Unless baked, LDPE film has a very low bulk density and is insufficient to transport. If at all possible, bake LDPE films before transporting. In some cases, recycling companies will provide the baking equipment for a limited amount of time when growers are removing field mulch or greenhouse coverings. In the state of New Jersey, there is a statewide effort to aid nursery growers on the recycling of LDPE films. In Michigan, there is a state-supported program to recycle LDPE plastic used to overwinter boats. This year, it seems there are more opportunities for growers to recycle LDPE plastic.

Polypropylene

**Uses:** Polypropylene is commonly used to construct plant containers for greenhouse production of houseplants, herbs, annuals, potted flowering plants and bedding plants. It is generally durable, lightweight and resists breakage. PP also is used for auto parts, food containers and dishware. Spun-bonded polypropylene (or woven polypropylene, trade-marked as Tyvek) is used as row covers for frost protection, moisture barriers for buildings and disposable water-repellent clothing.

**Reusing and Recycling:** Reusing PP containers is possible but carries the same warnings as those for HDPE containers, specifically Thielaviopsis. Virgin PP is white, whereas recycled PP will always be darker or even black because of contaminants, which in some applications presents a barrier. Polypropylene is one of the more difficult horticultural plastics to recycle, though some recyclers will mix it with HDPE to make landscape timber.

High-Impact Polystyrene

**Uses:** HIPS is commonly used for molding flats used for seedlings and small plants. Pure solid polystyrene is costless, but plug trays are generally black because they’re made from recycled plastic. These are inexpensive and extremely lightweight. HIPS trays and liners are increasingly made from recycled plastic, and some producers are displaying this information directly on the trays.

**Reusing and Recycling:** HIPS trays and liners are sometimes reused, but more often they are discarded or recycled. Some growers can accumulate HIPS trays in large numbers when they purchase and transplant young liners from a plug producer. HIPS trays are extremely light, difficult to compress and come in a multitude of designs. Unless they are all of the same design, they do not stack or nest. The trays may be clean, but the inserts are typically dirty. HIPS is relatively easy to recycle in many parts of the country. Some plastic recycling companies grind, melt and mold HIPS directly back into trays, which eliminates a step in the recycling process and enhances the financial return.

Polyethylene terephthalate (PET) is a plastic used in bottles, food containers and water-repellent clothing. PET is recyclable but some recycling companies have warned of reduced value in plastic containing PET. PET is not as biodegradable as HDPE and HDPE is not recyclable through PET recycling processes.

High-Density Polyvinyl Chloride (HDPE) is a cost-effective plastic that resists breakage. It is used for many building applications, including window frames and closures, water pipe, pommel and building boards. HDPE is usually white or black and is not as biodegradable as HDPE. HDPE is also used in many food and industrial products, such as milk jugs and water bottles.

Plastic lumber can be very heavy, but it’s becoming more popular each year. Some plastic lumber is constructed plant containers can be reused, but it is best to sterilize them. Thielaviopsis black root rot spores can persist in containers and infect subsequent crops of susceptible species. Still, some growers have reused containers and have avoided problems to date. Evergreen Acres Nursery near Spring Lake, Mich., reused 20,000 pots that customers returned. They cleaned and sorted the used pots and potted up perennials that were not impacted by Thielaviopsis black root rot.

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