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Horticultural Plastic Recycling — *The Future Is Brighter*

Pots, flats and other horticultural plastics can be a challenge to recycle after being contaminated with soil and other organic material. But the options are expanding, and programs are cropping up in communities and garden centers all over the country to handle these products efficiently and sustainably.

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



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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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to a single location for grinding. He has been able to secure funding for collection bins specifically designed and labeled for horticultural plastic. At this time, Cline and his team are grinding all the plastic together without sorting, and it is eventually made into landscape timbers. They even have their own grinder! According to the botanic garden's website, the Plastic Pot Recycling program has saved more than 680,000 pounds (340 tons) of plastic garden pots, cell packs and trays from landfills since its inception.

What You Can Do

Until we can generate revenues and support for such facilities, the rest of us can do our best by identifying local recyclers and working out collection mechanisms. Many recycling companies require a minimum amount of plastic before pickup. This can require growers to store plastic until they have accumulated an adequate amount or that several growers band together and combine their plastic. Localized collection sites, preferably with capacity to bale and grind plastic, would be ideal. Some growers and retailers have purchased used semis for on-

site storage until collection.

Volunteer-staffed recycle drives are still an important means of collecting plastic and directing it to appropriate recycling companies. These can be organized by individuals, communities, growers and retail nurseries. They generally require large amounts of coordination and volunteers, and they may require subsidization, depending on the amount of plastic collected, density of packing and distance to the recycler. At Michigan State University, we've conducted two successful recycling drives and collected more than four tons of plastic. In Emmet County, Mich., a collection drive this spring collected nearly five tons of plastic in four hours! There are many more successful examples. It is clear that the gardening public, greenhouse growers and landscapers are eager to divert more plastic from landfills — it makes economic and environmental sense. They just need to be given the opportunity!

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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 pesticides and herbicides.

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 infest 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 for landscaping, picnic tables and even railroad ties. Compared to wood, plastic lumber 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 baled, LDPE film has a very low bulk density and is inefficient to transport. If at all possible, bale LDPE films before transporting. In some cases, recycling companies will provide the baling 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 house plants, 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 dish-

ware. Spun-bonded polypropylene (or woven polypropylene, trademarked as Tyvec) 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 colorless, 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.

Polystyrene is also used in cafeteria trays, various cases and toys. Expanded polystyrene, known as Styrofoam, has long been used for small plant containers. Expanded polystyrene is generally more difficult to recycle and has a reputation for accumulating in the environment.

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