Turning Your Production Space

Adding an additional turn of production space can bring many benefits to your business. Read on to learn how to effectively produce a second perennial crop.

By Paul Pilon

Salvia 'May Night' in flower. (Photos: Paul Pilon)

Many growers are looking to maximize production space, extend the sales window and increase profitability. Adding another turn of production space allows growers to achieve these goals. In many instances, perennials are a good option for growers to consider because they provide shipping opportunities throughout the entire growing season. For example, it is not uncommon for growers to produce and sell perennials from frost to frost. Many growers who primarily produce annuals or bedding plants are turning to perennial crops to extend the production season and generate additional cash flow.

Consider This

Although perennials appear to be a natural fit for growers wishing to extend the production season, there are numerous factors growers must consider to produce a second crop of perennials, especially for those operations not particularly familiar with these crops.

From an outside perspective, producing perennials appears complicated, confusing and intimidating. Perhaps this perception comes from the generalization that all perennials are the same or looked at as if collectively they are ➧

Forcing Terminology

Juvenility	Refers to early stages of growth where a plant is incapable of flowering. Juvenile plants are incapable of perceiving and responding to the environmental stimuli that cause mature plants to flower.
Bulking	The growth period before the plant is placed into the other treatments necessary for flowering. Bulking can be used to overcome juvenility, plant establishment or to build plant size prior to forcing.
Vernalization	A cold treatment required by many perennials for flowering to occur.
No cold required	Perennials that do not require cold for flowering to occur.
Cold required	Plants that will not flower unless they receive vernalization. Also referred to as an obligate cold requirement.
Cold beneficial	Plants that do not require cold for flowering but experience some benefit from receiving a cold treatment. The benefit is often a reduced time to reach flowering, increased flower number per plant and/or more uniform flowering.
Photoperiod	The number of hours of light provided to or perceived by the plant each day. Most perennials have a certain photoperiod necessary for flowering to occur.
Long day required	This refers to perennials with an obligate requirement for long days; they simply will not flower unless they are grown under long days.
Long day beneficial	Also known as long day facultative, this refers to plants that receive some benefit, such as increased flower number or decreased time to flower, from being produced under long-day conditions.
Day extension*	Method of lighting used to create long-day conditions during naturally short photoperiods by extending the number of hours per day a perennial is exposed to light up to the desired day length.
Night interruption*	Also referred to as night break lighting, this is a method used to create long-day conditions by lighting from 10:00 p.m. to 2:00 a.m.
Short day required	Plants that will only flower following the onset of short days.
Black out	Method used to create short-day conditions by blocking out all of the light for a minimum of 13 hours per day.
Facultative short day	Also known as short day beneficial, this refers to plants that will eventually flower under other photoperiods but flower better when produced in short-day conditions.
Day neutral	Perennials that will readily flower under any photoperiod.

**At the darkest spot in the production area, 5-10 foot-candles of light should be delivered.*

Figure 1. In most instances, plants have more than one requirement for flowering. For example, a perennial may have both an obligate cold requirement and require long days for flowering. If either requirement is not provided, flowering will not occur or may be inconsistent.

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a commodity. Then the realization hits that they are not the same and each plant has a unique set of production requirements. I am amazed at the number of growers that initially approach perennials in this manner. When looked at and produced as individual crops with specific needs and when varieties with similar requirements are grouped together, the production of perennials becomes more practical and growers achieve improved results.

To keep consistent with the topic of producing an additional crop of perennials, it is important to establish a time frame. Let's assume for the remainder of this article that a first crop of plants (annuals or perennials) is produced and sold during the month of April and the second crop will begin in late April or early May for late June or July sales.

Therefore, it is important to pick crops that can fill out the containers in which they are grown and reach flowering (unless produced

Perennials Suitable for Second Turn of Production Space

Genus/Species	Suggested Cultivars	Cold Requirement	Photoperiod	Weeks to Finish***	Starter Materials
Achillea millefolium	'Paprika', 'Summer Pastels'	Cold Beneficial	LD Required	7	Vernalized Plug/Unvernalized Plug
Agastache rugusa	'Blue Fortune', 'HB'	No Cold Required	LD Beneficial	6	Unvernalized Plug
*Artemisia schmidtiana**	Species	Cold Required	LD Beneficial	6	Bareroot/Large Vernalized Plug
Astilbe chinensis	'Vision', 'Vision in Red'	Cold Required	LD Beneficial	7	Bareroot/Large Vernalized Plug
Buddleia davidii	'Adonis Blue', 'Peacock'	No Cold Required	LD Required	6	Unvernalized Plug
Campanula carpatica	Clips series, Pearl series	No Cold Required	LD Required	10	Unvernalized Plug
Campanula punctata	'Cherry Bells', 'Kent Belle'	Cold Required	LD Required	6	Vernalized Plug
Coreopsis grandiflora	'Early Sunrise', 'Rising Sun'	Cold Beneficial	LD Required	7	Vernalized Plug/Unvernalized Plug
Coreopsis verticillata	'Moonbeam', 'Zagreb'	Cold Beneficial	LD Required	8	Bareroot/Large Vernalized Plug
Delphinium grandiflorum	'Summer Blues',' Summer Nights'	No Cold Required	LD Beneficial	10	Unvernalized Plug
Dianthus deltoides	'Artic Fire', 'Zing Rose'	Cold Beneficial	Day Neutral	7	Vernalized Plug/Unvernalized Plug
Gaillardia grandiflora	'Arizona Sun'	Cold Beneficial	LD Required	8	Vernalized Plug/Unvernalized Plug
Gaura lindheimeri	Ballerina series	Cold Beneficial	LD Required	7	Vernalized Plug/Unvernalized Plug
Geranium x hybridum	'Rozanne'	Cold Beneficial	Day Neutral	7	Vernalized Plug/Unvernalized Plug

** Produced as a non-flowering perennial during this production period.*
*** Often sold as a non-flowering perennial.*
**** There are a number of factors that affect the number of weeks needed to produce a crop. These factors include but are not limited to the size and type of starting materials used, production temperatures, day length, light intensity and time of the year. Use the weeks to finish provided in this table as guidelines as they may vary under different circumstances.*

The cultivars supplied in this figure are intended for informational purposes and do not imply the endorsement of or exclusion of other cultivars that may also be suitable.

Figure 2. Perennials suitable for second turn of production space. *(Continued on page 44.)*

Campanula carpatica *'Pearl Deep Blue'*.

for the characteristics of the foliage) in 8-10 weeks. Crops that grow slowly or require multiple pinches are often not conducive for a second turn of production space.

Forcing Principles

Researchers at Michigan State University began examining the requirements for producing flowering perennials in the early 1990s. This research has provided growers with the information necessary to consistently produce flowering plants throughout the year. Understanding the principles of producing flowering perennial crops allows growers the ability to design perennial programs throughout the year. Let's briefly explore the terminology of forcing perennials (see Figure 1, page 38) and see how these principles can be applied to design a program for producing a second perennial crop.

Photoperiod

During this time frame, the natural day lengths are long: exceeding 13 hours in all parts of the country by April 15. However, it is worth noting that the critical photoperiod for flowering of numerous long-day perennials is 14 hours, which occurs in all parts of the country by May 15. Therefore, if a crop is started on May 1, providing photoperiodic lighting may not be necessary for long-day crops, but if crops start in early April, it would be beneficial to initially provide long days to them. In most instances, the crops produced for an additional turn of production space require or benefit from long photoperiods, but there certainly are a number of day-neutral perennials suitable for production during this time frame.

Vernalization

For several perennials, it is necessary to understand the vernalization requirement of the varieties being produced. For plants with an obligate cold requirement, flowering will not occur unless the starting material (plugs or liners) or the established container has undergone a cold treatment. Growers producing perennials with absolute cold requirements should take steps to ensure these varieties have been given the appropriate vernalization.

Be aware all perennial plugs available to the market in April and May have not necessarily undergone a cold treatment. Many plug producers start new batches of perennials in late winter and early spring; in most cases, these new batches are not vernalized. If your production plan requires vernalized plants, ➧

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contact your perennial plug supplier to request only vernalized materials. It can be very frustrating to produce a nice crop of non-flowering plants and not be able to sell them due to lack of flowers.

Several perennials are classified as cold-beneficial plants. These varieties will flower with or without receiving vernalization. In many cases, plants that have received a cold treatment reach flowering slightly faster, produce more blooms per plant or flower more uniformly. When producing cold-beneficial perennials, the decision to use vernalized materials for the most part is optional and often is based on personal preference and past experiences.

Perennials Suitable for Second Turn of Production Space

Genus/Species	Suggested Cultivars	Cold Requirement	Photoperiod	Weeks to Finish***	Starter Materials
Geranium pratense	'Midnight Reiter'	Cold Required	LD Beneficial	8	Vernalized Plug
Heuchera x hybrida **	'Plum Pudding'	Cold Required ***	Day Neutral	7	Vernalized Plug/Unvernalized Plug ***
Lamium maculatum	'Anne Greenaway', 'Orchid Frost'	Cold Beneficial	Day Neutral	6	Vernalized Plug/Unvernalized Plug
Lavandula angustifolia	'Hidcote Superior', 'Munstead Dwarf'	Cold Beneficial	LD Beneficial	9	Vernalized Plug/Unvernalized Plug
Leucanthemum superbum	'Snow Cap'	Cold Beneficial	LD Beneficial	8	Vernalized Plug/Unvernalized Plug
Lilium x asiatic	'Pixie' Series, 'Lily Looks' series	Cold Required	Day Neutral	6-8	Bulb (Cooled/Vernalized)
Lobelia x speciosa	'Fan' Series	Cold Beneficial	LD Required	7	Vernalized Plug/Unvernalized Plug
Monarda x hybrida	'Petite Wonder', 'Petite Delight'	Cold Beneficial	LD Required	10	Vernalized Plug/Unvernalized Plug
Nepeta faassenii	'Walkers Low'	Cold Beneficial	LD Required	6	Vernalized Plug/Unvernalized Plug
Penstemon mexicale	'Pike's Peak', 'Red Rocks'	No Cold Required	LD Beneficial	8	Unvernalized Plug
Perovskia atriplicifolia	species, 'Little Spire'	Cold Beneficial	Day Neutral	7	Vernalized Plug/Unvernalized Plug
Platycodon grandiflorus	'Sentimental Blue', 'Astra' series	Cold Beneficial	LD Beneficial	8	Vernalized Plug/Unvernalized Plug
Rudbeckia hirta	'Becky' series, 'Autumn Colors'	No Cold Required	LD Required	7	Unvernalized Plug
Salvia x sylvestris	'Marcus', 'May Night'	Cold Beneficial	LD Beneficial	6	Bareroot/Vernalized Plug/Unvernalized Plug
Scabiosa columbaria	'Butterfly Blue', 'Pink Mist'	Cold Beneficial	LD Beneficial	8	Vernalized Plug/Unvernalized Plug
*Sedum spectabile**	'Autumn Fire', 'Matrona'	Cold Beneficial	LD Required	7	Bareroot/Large Vernalized Plug
Veronica spicata	'Red Fox', 'Royal Candles'	Cold Required	Day Neutral	9	Vernalized Plug

** Produced as a non-flowering perennial during this production period.*
*** Often sold as a non-flowering perennial.*
**** There are a number of factors that affect the number of weeks needed to produce a crop. These factors include but are not limited to the size and type of starting materials used, production temperatures, day length, light intensity and time of the year. Use the weeks to finish provided in this table as guidelines as they may vary under different circumstances.*

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Figure 2 (continued from page 40). Perennials suitable for second turn of production space.

In many cases, plants that have received a cold treatment reach flowering slightly faster, produce more blooms per plant or flower more uniformly.

Lilium 'Orange Pixie' ready for shipping.

Plants with no cold requirement can be started using either vernalized or unvernalized starting materials. Providing a cold treatment is not detrimental in most instances but is not necessary for producing flowering plants of perennials with no cold requirement.

Stagger Planting Dates

Some growers pot up all of their crops simultaneously when filling the greenhouse space for this additional turn of production space. Since many of these crops require differing production times, it is beneficial to begin scheduling using the date each variety requires for sales and counting backwards the number of weeks needed for production. The following example was derived from Figure 2, opposite and page 40.

Two crops, *Delphinium grandiflorum* 'Summer Nights' and *Lamium maculatum* 'Orchid Frost', are needed to fulfill a shipment during week 26. The delphinium requires 10 weeks to finish and should be planted during week 16, whereas the lamium takes only six weeks to finish and planting should occur in week 20.

Planting both of these varieties during week 16 would result in the proper crop timing for the delphinium, but the lamium would most likely be overgrown, out of bloom and may not be salable. Conversely, planting both of these varieties during week 20 would result in the appropriate scheduling for the lamium, but the delphinium would most likely be too small and non-flowering and may not be shippable. It is very important to begin with the date each particular crop needs and count backwards using each crop's specific week to finish to determine the appropriate planting date.

Starting Materials

Another factor to consider is the size of the starter materials used and the effect it has on the finishing times of many crops. In general, larger-sized starter materials will finish the final container quicker than smaller sizes. For example, it is not uncommon for growers using 72-cell plugs to finish a crop 1-2 weeks earlier than when using 128-cell plugs. Increasing the plug size to a 21-cell or 30-cell size will continue to reduce the production time; it is not uncommon to reduce the production time by at least four weeks when these larger plug sizes are used. Production time can also be reduced to some extent by ➧

Rudbeckia 'Autumn Colors'.

planting multiple plugs per container when small plug sizes (72 cell or 128 cell) are used.

Variety Selection

Variety selection is a big consideration when putting together a second turn of perennials. Growers who don't typically produce perennials will often only produce a limited number of perennial varieties for this additional turn of production space. They might produce six, 10 or 12 perennial varieties rather than producing a full line of perennials. Often, their goal is to produce large quantities of a limited number of varieties rather than offering a wide selection of limited quantities.

Growers producing perennials year round often have several markets available to them over the entire growing season and are more open to producing a wide selection of perennials than are traditional greenhouse operations. In many cases, the varieties they produce are those that have had good success overwintering.

To increase production success, I recommend growers avoid producing early spring flowering perennials such as aquilegia, doronicum and pulmonaria during this mid-season turn of production space. Many of these early spring season perennials are not easily produced out of season and should be avoided to improve the overall success of the second turn of production space. Although it is possible to produce flowering aquilegias for early July sales, it not practical for most growers to do so.

Conclusion

Using the forcing requirements of each perennial variety and considering the other factors affecting production and crop timing, growers can effectively and profitably produce a second turn of production space with perennial crops. The principles outlined in this article can be used to help lay the foundation for building a successful program. GPN

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