Young Plant Prefinishers - A New Type of Grower!

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INTRODUCTION:
This editorial outlines 1) existing problems in the bedding and/or minor potted plant industry, 2) the need for a new segment in the floriculture industry to meet those needs, 3) the information that will drive the development of this new segment and 4) how growers will have to change to be a part of it.

THE PROBLEM:
A common problem in the bedding and minor potted crop industry is an inability to precisely time flowering of product throughout a year. This issue was overcome in the major potted plant industry by thoroughly understanding factors that control flowering of crops such as chrysanthemum and poinsettia and manipulating growth through photoperiod control. In contrast to the major potted plant industry, our understanding of factors that affect flowering of minor potted plants, many bedding plants and nearly all of the new specialty annuals is lacking and has resulted in undesirable premature flowering or delayed flowering on many of these crops. For instance, many growers had difficulty getting Petunia 'Purple Wave' to bloom at the same time as their other petunias. Had growers known that 1) Purple Wave has a longer juvenile period and 2) is an obligate long-day plant they would have understood that additional long-day lighting is required with this petunia compared to other petunias in order to have plants flower at the same time. Similarly, early or late flowering in calceolaria and cineraria are commonplace. Amazingly, a comprehensive evaluation of bedding plant responses to daylength has not been conducted since the work of Post in the early 1940's. Because of this, we are initiating a large survey at the University of Minnesota to better understand the basic responses of numerous bedding and minor potted plant species to photoperiod and light intensity.

In addition to issues related to predictability and uniformity of flowering, the floriculture industry has had two recent major challenges: 1) mass marketers are now major retailers of floriculture products and 2) the cost of labor and health coverage has increased greatly. The impact of these changes has 'tightened' crop schedules to increase profitability and reduced the ability of some companies to sustain any crop losses due to early/late flowering. Also, predictability of flowering date has become more important as mass marketers may insist on a product being at a specific stage of development when delivered.

BACKGROUND:
The problems mentioned above will likely be solved by advances made in the plug industry. Most bedding plants and minor potted crops are propagated from seed. Since the 1980's, most seed germination is conducted in plug trays. During the last 20 years, an entire industry has developed that specializes in young plant/seedling/plug production. The use of plugs has nearly eliminated the need for seed germination areas for many growers, increased crop uniformity, reduced crop time in a finisher's facility, and reduced labor costs at many finishers' facilities. Fully 81% of annuals grown in 1998 were started in plugs. Forty four percent of seedlings were purchased as finished plugs from another grower.

In order to effectively reduce crop time and precisely predict/time when plants will flower, while not compromising plant quality, a grower must know 1) when a seedling is capable of initiating flowers and 2) what conditions promote flowering. Every bedding plant or potted plant produced from seed has a juvenile and a reproductive phase. The juvenile phase is that phase of development when a plant is incapable of being reproductive or producing flowers. This phase usually occurs immediately after germination until a seedling has unfolded approximately 5 leaves with many annuals. In contrast, the juvenile phase of perennials can often last until a plant has unfolded approximately 10-17 leaves. Plug producers often have control of the juvenile phase of most bedding and minor potted plants. Since many annual and/or minor potted plant seedlings are shipped with greater than 5 leaves, plug growers often have control of the early stages of the reproductive phase.

The reproductive phase is that phase when a plant is capable of flowering. Species will initiate flowers if plants are under conditions that are conducive for flower induction. What conditions are optimal for flowering varies with plant species. For example, we know that flowering of many bedding plant species is sensitive to day/night length, i.e. they are photoperiodic. Petunias, snapdragons, Rudbeckia, and pansies will flower earlier if grown under long-day conditions, i.e. a longer day than night. In contrast, African marigolds, gomphrena, chrysanthemums and Morning Glories require a shorter day than night for rapid flowering. Impatiens and vinca flowering is not affected by daylength. Flowering of many perennials will only occur if plants are cooled for a period of time. Some species will induce flowers earlier when stressed, i.e. undesirable early flowering resulting from water stress on Celosia. Further, additional total light applied to some annuals such as seed geraniums will reduce the length of the juvenile phase and result in earlier flowering. Specialty annuals sold as liners are propagated from plants already past their juvenile phase and will, therefore, respond immediately to the environment they are placed under.

Most plug growers produce a variety of plant species under varying daylength,

temperature and light conditions throughout a year. As a result, inconsistency in flowering time of seedlings can occur. Recently, growers have improved consistency of some of their young plants by providing a more consistent light intensity and photoperiod to crops by adding supplemental high-pressure sodium lighting. The addition of lights can dramatically improve young plant quality by increasing dry weight, can result in earlier flowering on the day-neutral seed geranium, and will induce flowering on receptive long-day plants. In contrast, these same lights can delay flowering of short-day plants. However, our understanding of how light intensity impacts flowering of most bedding plants is lacking.

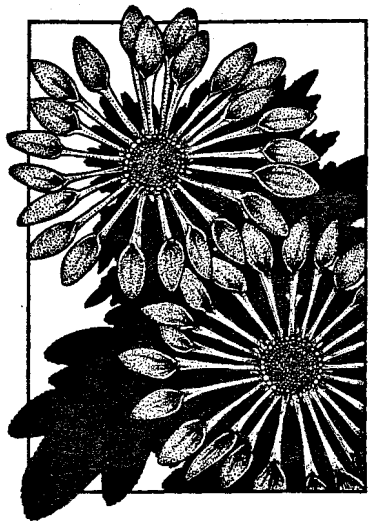
EMERGENCE OF A NEW PRODUCT AND INDUSTRY:

As new information becomes available, both plug growers and annual/minor potted crop finishers will be able to precisely schedule crops, maximize flowering and produce young plants that are prefinished for different container sizes. A new segment of the young plant industry will emerge that will produce prefinished young plants with guaranteed flowering dates when forced under a given set of conditions. Evidence of this is already occurring with young plant growers who vernalize large perennial plugs and sell them as pre-induced plants to be finished at another facility. Similarly, rooted and cooled Regal geranium cuttings have been sold preinduced for finishing at another facility for some time.

Plug growers who will use this information most effectively will have to 1) invest in greenhouse structures that enable them to provide different photoperiod/lighting/cooling treatments and 2) change their production schedules to accommodate different lighting/temperature treatments during the life of a young plant in their facility. Such facility and production schedule changes will allow a young plant producer to grow premium seedlings specialized for different size containers. For instance, young plant producers will prefinish seedlings for use as a flatted, 4", 6", basket or large container product. Seedlings destined for larger containers may be kept vegetative longer to increase branching and plant size to enable plants to fill a container at a finisher's facility and then flower. In contrast, immediate flowering may be desirable for some flatted materials so prefinishers may induce those seedlings as soon as the juvenile phase has ended. In addition to growing seedling for specific product sizes, environmental manipulation will allow more precise scheduling of flower induction/initiation of many annual species that will allow a plug producer to guarantee a flowering time for the finisher under specific temperature conditions.

CONCLUSION:

Those growers who take advantage of this information will step in front of the rest of the 'pack' (rather than keep 'plugging' along – sorry) and produce superior, high quality plugs specifically suited for a finishers needs. These growers will fill a new specialized niche in the floriculture industry that will grow in the years to come and make finishing crops more simple and predictable. The growth of this new sector of the industry is a natural outgrowth of more efficient production and follows advances made in the potted and cut flower industries.



PRIMULA PRODUCTION

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Growth Retardants:

Growth retardants are used to control peduncle/pedicle elongation on primula as well as excessive leaf expansion. B-9 is effective (1000-2000 ppm) on P. *vulgaris, x polyantha, sinensis and malacoides*. B-9 is ineffective on *P. obconica*.

Insects and Diseases:

Primula can develop aphid, thrip, fungus gnat and/or mite infestations. Of most significance is the spread of tomato spotted wilt virus (TSWV)/impatiens spotted wilt virus (INSV) by Western flower thrips. There is no cure for either of these viruses.

Symptoms include general stunting of plant growth and/or spotting of foliage. Control is achieved by removing infected plants, controlling thrips and not shipping in infected materials.

Postharvest:

Harvest primula when 5-7 florets have opened. Application of a spray of 0.25 mM silver thiosulfate (STS) 5 days prior to harvest will increase postharvest life. Ship at temperatures of 36-43°F.

Scheduling:

A schedule for *P. x polyantha* production is shown below. Contact me for schedules for *malacoides* and *obconica*.

Other Sources of Information:

Information of Primula varieties and culture can be found on the following web sites:

1) www.goldsmithseeds.com
2) www.daehnfeldt.com