Top 10 Reasons to Consider Grower-Specific ERP Software

By Lisa Hattery

Efficiently managing resources is becoming increasingly important across all industries, large and small. In the horticulture industry, where inventory is constantly growing, dying, and shifting, it is especially important to be resourceful, and even more important that the enterprise resource planning (ERP) software matches a grower’s unique process. Software for “widgets” just will not do.

Grower-specific software is designed just for the distinct problems growers face every day—the software fits your process, not the other way around. You should not have to change your process to work with generic software.

Without further ado, here are the top 10 reasons every grower should consider a grower-specific ERP software system:

1. Production Management from Seed to Sale
   Production management software essentially allows users to plan what quantities they want to have available and when. The system then drives production of that plant material from ordering bill of materials, seeding or sticking cuttings, transplants, and all tasks associated with production. Additionally, production management software will give you better visibility of stock inventory, order demand, demand

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Cross Promotion: Partnering With Other Businesses to Better Serve Your Customers

By Kathleen Kelley

How can garden centers, retail nurseries, and similar businesses provide customers with a complete package when creating or enhancing their outdoor living space? With the addition of decking, lighting, and outdoor kitchens it is possible that one retailer does not provide all that is needed to complete the desired outcome, and in some cases the customer does not have the ability to recreate a landscape they see displayed at a garden center. One idea to resolve these issues is to partner with business owners who sell complementary goods and services, thus the two businesses work together to help customers obtain a complete “package.” Promoting goods and services offered by business owners you have an existing and trusted relationship with takes the guesswork out of where to direct customers, and your recommendation also helps reduce the risk for your customers.

Such a situation, known as cross promotion, is based on two (or more) businesses working together toward a common goal, whether it relates to promotion, advertising, cause

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OFA Bulletin This is a member benefit of OFA – The Association of Horticulture Professionals.
Plant growth regulators (PGRs) that enhance branching of floricultural crops include ethephon (Florel, Monterey Chemical), BA (benzyadenine, Configure, Fine Americas, Inc.), and dikegulac sodium (Augeo, OIIP, Inc). These PGRs are frequently called “chemical pinchers” because they generally inhibit the growth of the terminal shoots or enhance the growth of lateral buds, thereby increasing the development of lateral branches. The goal in enhancing branching of floriculture crops is to activate dormant buds or stimulate the formation of adventitious buds by an application of PGRs. However, it is critical that these new axillary buds develop and grow out to form normal branches.

Configure enhances branching in a wide variety of floricultural crops. By shifting the balance of auxin which cause apical dominance and cytokinins which stimulate branching, Configure stimulates, but does not cause, an increase in branching. Therefore, timing of the application is critical to a good branching response. BA has a short period of activity and has no residual in the plant. So, multiple applications may be useful with many crops. Furthermore, it is not well translocated in the plant so thorough coverage is required.

Augeo was released to the market in 2010. The active ingredient, dikegulac sodium, has been available on a limited basis in the woody ornamental PGR Atrimec (PBI Gordon) for many years. The Augeo formulation has a different carrier that has proven to cause much less phytotoxicity on herbaceous plant materials than the Atrimec formulation. Dikegulac sodium acts by disrupting the cell walls in the apical meristem which effectively delivers a chemical pinch which releases apical dominance. This effect typically delays plant growth for a few days to a couple of weeks depending on crop and rate.

Florel is a product that releases ethylene inside the plant after application. Florel has a long history of use on specific crops like geranium, poinsettia, and pansies, as well as on stock plants and cuttings to remove flowers and enhance branching.

Branching agents can be used to replace mechanical pinching in many crops and have been used to enhance branching of many finished plants of herbaceous perennials. Enhancement of plant branching improves plant architecture, tends to provide some growth regulation, improves pot fill and thereby may reduce crop time, may increase number of flowers, and increases available propagules on stock plants.

However, many of these effects would be advantageous at the liner production stage as well. Therefore, the following studies were conducted to evaluate these products at various application rates on herbaceous perennial liners during propagation. We wanted to address several questions. Do these products enhance branching of recently rooted liners? Do they reduce root growth of the liners? Will these products affect liner quality or finished plant quality?

Materials & Methods

Eleven plant species were studied over two years:

- Agastache ‘Purple Haze’
- Aster ‘Professor Kippenburg’
- Campanula ‘Cherry Bells’
- Cosmos atrosanguineus
- Gaura lindheimeri ‘Siskiyou Pink’
- Lavandula x intermedia ‘Provence’
- Leucanthemum x superbum ‘Snowcap’
- Rosmarinus officinalis ‘Hill Hardy’
- Salvia nemorosa ‘May Night’
- Verbena bonariensis ‘Lollipop’
- Veronica ‘Goodness Grows’

Plant material arrived as unrooted cuttings, which were dipped for 10 seconds in 1,500 ppm IBA rooting hormone (Hortus IBA Water Soluble Salts 20% IBA) as a basal treatment and stuck into 72 size plug trays filled with a peat-lite media (Fafard 3B). Cuttings were allowed to root under mist with bottom heat at 72°F for up to four weeks. Cuttings received clear water under mist, but after removal from mist received 100 ppm N with each irrigation using Peters 20N-10P-20K fertilizer (Everris/The Scotts Co. LLC).

Treatments were applied when roots from cuttings were evident on all four sides of the root ball, but liners were not yet fully rooted and ready for transplant (27 to 34 days after sticking). Treatments were applied as foliar sprays with a CO₂ backpack sprayer applying the label recommended volume of one gallon per 200 sq.ft. Each crop and PGR constituted an individual experiment setup in a completely randomized design. Experimental units consisted of 6 plants, 1 cell pack, with 78 units per plant species.
Table 1. Summary of the effects of Configure, Augeo or Florrel on branching of herbaceous perennial liners at 3 to 4 weeks after treatment.

<table>
<thead>
<tr>
<th>Plant</th>
<th>Configure</th>
<th>Augeo</th>
<th>Florrel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agastache 'Purple Haze'</td>
<td>45% increase</td>
<td>NA*</td>
<td>NA*</td>
</tr>
<tr>
<td>Aster 'Professor Kippensburg'</td>
<td>Phyto-tip burn</td>
<td>30% increase at 1600 ppm</td>
<td>No effect</td>
</tr>
<tr>
<td>Campanula 'Cherry Bells'</td>
<td>No effect</td>
<td>40% increase at 800 ppm</td>
<td>No effect</td>
</tr>
<tr>
<td>Cosmos atrosanguineus</td>
<td>Phyto - distorted leaves</td>
<td>30% increase</td>
<td>No effect</td>
</tr>
<tr>
<td>Gaura 'Siskiyu Pink'</td>
<td>20% increase</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Lavandula 'Provence'</td>
<td>20% increase at 300x2 or 600x1 ppm</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Leucanthemum 'Snowcap'</td>
<td>100% increase</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Rosemary 'Hill Hardy'</td>
<td>40% increase at 300x2 or 600x1 ppm</td>
<td>20% increase at 400 or 800 ppm</td>
<td>NA</td>
</tr>
<tr>
<td>Salvia 'May Night'</td>
<td>35% increase at 1 or 2 apps. of 300 ppm</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Verbenia 'Lollipop'</td>
<td>70%-140% increase</td>
<td>600-800% increase</td>
<td>250% increase</td>
</tr>
<tr>
<td>Veronica 'Goodness Grows'</td>
<td>100%-200% increase</td>
<td>Over 1000% increase</td>
<td>600% increase</td>
</tr>
</tbody>
</table>

*NA indicates that this product was not applied to this crop.

Agastache treated with Configure had a 40 percent increase in lateral branches (Figure 1) but root dry weight reduced was 40 percent at 3 WAT. However, this reduction in root dry weight of the liners did not affect appearance of finished plants after four weeks of growing out.

Aster liners were responsive to Augeo with a 40 percent increase in the number of leaders (control 3.4 vs. treated 4.8) and nearly 30 percent increase in branches (control 18 vs. treated 23) in plants treated with 1,600 ppm Augeo. However, this rate reduced plant height, width, and shoots, but not root dry weight. Florrel had no significant effects on growth of Aster liners. Neither PGR affected growth nor quality of the finished plants relative to controls after four weeks grow out.

Configure (benzyladenine) was applied as foliar sprays at 4 rates: control (0 ppm), one application of 300 ppm, two applications of 300 ppm (one at week 0, and the second 2 weeks later), or one application of 600 ppm. Augeo (diketogulac sodium) was applied at 4 rates: control (0 ppm), one application of 400, 800 or 1,600 ppm. Florrel was applied as a comparison treatment to some crops at 500 ppm. Not all treatments were applied to all crops (Table 1).

Data was collected at 0 and 3 or 4 weeks after treatment (WAT) on individual plants in each experimental unit, and included plant height, numbers of leaders (shoots arising from the soil line) and lateral branches or basal branches, and phytotoxicity. Root and shoot dry weights were measured at the end of the liner production phase.

After liner growth data was collected, 10 plants of each treatment were randomly selected, potted into quart plastic pots (1.1 liter) filled with Fafard 3B medium and grown out for a period of 4 additional weeks after which plant height, average width, shoot and root dry weights, and numbers of leaders and lateral branches or basal branches were measured.

Data was analyzed within crop and PGR combination by ANOVA and subjected to LSD means separation (P ≤0.05) using SAS Version 9.2 by SAS Institute Inc. (Cary, NC).

Results

Phytotoxicity was noted on a limited number of crop and PGR combinations. Configure caused significant tipburn on Aster which resulted in severe delays in plant growth. Configure caused distortion of the leaves of Cosmos which persisted through the four week grow out period (5 WAT). Augeo caused some leaf distortion on Verbena shortly after treatment but these plants grew out normally. Although additional testing should be conducted, use caution with application of these PGRs to crops identified as exhibiting phytotoxicity.

Liner quality was generally enhanced by branching agents with increases in the numbers of lateral or basal branches in most crops (Table 1) and in some cases increased numbers of leaders or shoot dry weight. In other words, the branching agents resulted in larger liners that may finish more quickly.

![Figure 1. Agastache 'Purple Haze' treated with Configure at 0, 300x1, 300x2 or 600x1 ppm (left to right). Photo at three weeks after treatment.](image)

Augeo at 800 ppm increased branching of Campanula liners 40 percent relative to control plants, with no effect on shoot or root dry weight. There were no significant effects on finished plants. Configure had no significant effect on branching or growth of Campanula.

Only 1,600 ppm Augeo increased numbers of branches (30%) and leaders (40%) on Cosmos liners. This treatment also reduced shoot dry weight but increased root dry weight of liners at 3 WAT. After three weeks grow out, these treated plants still had a greater number of leaders and branches with no reductions in shoot or root dry weights. Neither Configure nor Florrel affected growth or branching of Cosmos.

Configure increased leaders (53%) and lateral branches (20%) of Gaura liners with no effect on root dry weight at 4 WAT. Finished plants had more shoots and branches than control plants after four weeks grow out.

Configure increased the numbers of leaders (68%) and lateral branches (21%), and shoot dry weight of Lavandula liners at 4 WAT (Figure 2, page 6). The two applications of Configure at 300 ppm reduced root dry weight of the liners,

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but also resulted in the highest number of shoots and branches on the finished plants after four weeks grow out.

Configure doubled the number of basal branches of *Leucanthemum* liners but reduced root dry weight 25 percent to 40 percent at 4 WAT. However, grow out of the liners was not affected by the reduced root dry weight.

Rosmarinus was very responsive to the PGRs. Configure at the 300x2 or 600x1 ppm rates also increased the numbers of leaders 192 percent (control 1.3 vs. treated 3.8) and lateral branches 40 percent (control 17 vs. treated 24), and root dry weight 60 percent. Although these Configure rates resulted in finished plants that looked good, they were somewhat shorter with reduced shoot and root dry weights. Augeo increased numbers of leaders 150 percent to 350 percent (control 1.6 vs. treated 4.0 to 7.3 leaders) and branches 20 percent (control 20 vs. treated 23 to 25 branches) (Figure 3). After four weeks grow out plants treated with 800 or 1600 ppm Augeo still had greater numbers of leaders (control 11 vs. treated 14-15) and branches (control 46 vs. treated 56-64) compared to the control plants.

Configure at 300 ppm once or twice increased basal branching 40 percent of *Salvia* liners with no effect on root dry weight at 4 WAT and no effect on finished plants.

The number of lateral branches of *Verbena* liners was increased with 300x2 or 600x1 Configure at 3 WAT and root dry weight was not affected. After four weeks grow out, the number of branches was no longer significantly different but the 300x2 ppm Configure treatment reduced flower height and shoot dry weight of finished plants. Augeo caused twisting of *Verbena* leaves in the liner phase but plants grew out of symptoms in grow out phase. Augeo increased branching of the liners (control 1.3 vs. treated 9-12) (Figure 4). Florel also increased branching with an average of 5 branches per liner. After four weeks grow out, plants previously treated with 800 or 1,600 Augeo had a greater number of branches (control 28 vs. treated 32-38) whereas liners treated with Florel had fewer branches (18 branches) than control plants.

![Figure 2. Lavandula 'Provence' treated with Configure at 0, 300x1, 300x2 or 600x1 ppm (left to right). Photo at four weeks after treatment.](image)

All Configure treatments increased basal branching of *Veronica* (control 2.3 vs. treated 5.0 to 9.3) (Figure 5). Root dry weight was not affected. After four weeks grow out, plants had excellent appearance but plants treated with 300x2 ppm Configure had reduced root dry weight. *Veronica* was sensitive to Augeo with all rates increasing branching (control 1.0 vs. 400 ppm treated 8.0) but the higher rates caused excessive and persistent shoot growth reductions (Figure 6). Root dry weights were not affected. Florel also increased branching (control 1.0 vs. treated 4.1).

![Figure 3. Rosmarinus 'Hill Hardy' treated with Augeo at 0, 400, 800, 1600 ppm (left to right). Photo at four weeks after treatment.](image)

**Impact on the Industry**

Do branching agents reduce root growth of the liners?

None of the six crops evaluated with Augeo or of the five crops tested with Florel exhibited any reductions in root dry weight in the liner stage. Three of 11 crops tested with Configure showed reduced root dry weight of finished liners.
In these three crops, branching was enhanced. Agastache liners had a 40 percent reduction in root dry weight at 3 WAT but this did not affect the appearance or size of the finished plants after four weeks grow out. Root dry weight of Leucanthemum liners was reduced 25 percent to 40 percent at 4 WAT but the grow out of these plants was not affected. In Lavandula, 300x2 ppm Conferge reduced root dry weight of liners but also resulted in the highest number of shoots and branches on the finished plants at four weeks after planting. In summary, when applied to reasonably well rooted liners, the branching PGRs do not appear to have any negative impacts on root growth.

Do branching agents affect finished plant performance? Some crops showed improvement in final plant quality (Gaura, Lavandula, Rosmarinus, Verbena, Veronica) when the liners were treated with the branching agents. Except for phytotoxic effects on specific crops, we have seen no negative effects of liner-applied branching agents on finished plant quality.

In summary, branching agents can improve branching during liner production and in our tests to date, any decreases in rooting have not affected finished plant quality. Test the products for phytotoxic responses on new crops. The branching agents appear to have a short term effect in some crops which indicates a value in reapplying branching agents to the plants shortly after transplanting liners to finished containers.

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trends, and vendor liner availability. Access to this comprehensive information will help growers make better production planning choices throughout the season. Take the guess work out of production; study sales history, lost sales, and dumping to get an accurate picture of what really happened. Also, a good production management system will have a space analysis tool to help you plan for tables, floor, and hook counts. Using an integrated system allows you to distill the intricate process of plant production down into an intelligible and dynamic user interface.

2. Smarter Inventory Allocation

Managing orders versus changing inventory in most widget systems if very tough, as they are not designed for ever-changing plant inventory. In a good green industry ERP system users can adjust and change inventory by day, such as dumps, ready date changes, etc. Then, a nightly allocation job runs automatically in the system to show what orders now have shortages or what product became available after the daytime changes. An automatic e-mail notification shows users what orders need to be fixed and where there are opportunities to sell more.

3. Reduce Labor with EDI Automation

Do you supply box stores? If so, surely you know how much time and labor it can take to manage your electronic data interchange (EDI) transactions. Software with EDI automation will help you dramatically reduce EDI labor costs. Automated procedures will only notify you if imports have not run as planned. Set specific criteria to check per automated EDI job, which will allow you to avoid having to review any transactions unless issues exist. Configure the criteria by transaction type, price, SKU, or duplicate purchase order, as these are the common causes of EDI import issues.

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