Teaching Methods

Hothouse Bothers: A Case Study

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SUMMARY. This decision case concerns production and marketing problems that many ornamental growers incur. At the retail level, popular ornamental crops are often used as loss leaders to draw the public into stores to make other purchases. As a result, retail buyers are concerned not with quality but with price and volume. To meet the needs of price-conscious buyers, growers may attempt to reduce their production costs by reducing the level of production inputs, with some sacrifice in product quality. The owners of Two Sisters Greenhouses must decide whether they are going to produce lower-quality plants, change marketing strategies, or grow alterna-

tive crops to retain their current profit margins. This case study was intended for use in greenhouse management, nursery management, and floriculture courses where students assume the role of a decisionmaker in poinsettia production and marketing.

Poinsettias are the leading container crop in the U.S. floriculture industry or trade (USDA, 1996). Because poinsettias are a winter seasonal crop, they are grown across the United States when typically little else of similar significance is grown. The wholesale value of poinsettias, however, has continually decreased while production costs have increased. There are several reasons for the decrease in wholesale value. A reduction in poinsettia quality is thought to be related to changing market channels. In the past, many poinsettias were sold in small retail garden centers and florist shops with a demand for a high-quality plant. Currently, mass merchandisers often sell poinsettias as a loss leader to draw the public into their stores to purchase other products at higher prices (Ball, 1994). The demand for quality poinsettias has thus been reduced and so have the prices. The dilemma for growers is that the wholesale prices demanded by the chain stores are at or below the cost of producing poinsettias, even when production is increased by spacing the plants more closely. Profits become low or nonexistent. Typical grower response has been to increase crop production in the same greenhouse space, resulting in smaller plants, smaller bracts, a diminished shelf life, and poorer overall quality.

Most horticulture graduates will deal with issues similar to these incurred in poinsettia production. This

case study will help students develop problemsolving skills required for producing and marketing nearly any crop.

Two Sisters Greenhouses

Two Sisters Greenhouses has been in business for ≈5 years. Chloe and Samantha are sisters who grew up in a rural farm community. They both developed an interest in plants at a very early age and were always the top competitors at the 4-H and FFA floriculture contests. After finishing high school, Chloe and Samantha majored in horticulture at the state land-grant university. Chloe is 2 years older than Samantha and she went to work as the sales manager and grower at a wholesale greenhouse operation in a nearby city after graduating from college. Samantha minored in accounting and as her senior honors project drafted a personal plan for starting a greenhouse operation after graduation.

Chloe and Samantha purchased a small greenhouse operation close to their home town. There are five free standing quonset greenhouses and five gutter-connected greenhouses encompassing ≈30,000 ft² (2,800 m²) of growing space combined. They also purchased a small delivery truck because they felt that personal delivery would help them maintain a strong relationship with their customers. Samantha is in charge of sales, maintains all the books, and places all the orders. Chloe is in charge of growing all the crops and delivery. They grow bedding plants and poinsettias and started growing fall garden mums 2 years ago on a newly constructed 5,000-ft² (465-m²) nursery.

Two Sisters Greenhouses has earned a reputation for producing top-quality plants and their efforts have been very profitable. They have continued to make improvements to the existing greenhouses, e.g., rolling benches, automated irrigation systems, shade cloth, etc., and they have maintained a loyal customer and employee base.

Chloe and Samantha were preparing for another poinsettia production season. Chloe had always looked forward to this time of year, as it meant that her favorite holiday, Christmas, was coming. However, a Scrooge in the form of a marketing dilemma had come early this year. Two Sisters Greenhouses could produce a quality poinsettia for about \$4.50 (Table 1). They

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Table 1. Estimated cost of producing a 6-inch pinched poinsettia.

Cost type	Cost (\$)
Variable ^z	
1) Plants—rooted cutting	0.65
2) Container—6-inch standard container	0.18
3) Medium—standard media	0.15
4) Labels	0.02
5) Sleeve—6-inch pot sleeve (8 × 22 × 24)	0.11
6) Cycocel	0.21
7) Fertilizer	0.11
8) Pesticide	0.20
Overhead ^y	2.76
Total estimated cost per plant	4.39

^zVariable costs were taken from Hummert International, 1995.

^yIncluded here are labor and all fixed costs, such as fuel bills, depreciation, maintenance, water, electricity, office costs and billing, manager's salary, etc. This cost will vary throughout the year, but an average is usually figured to stabilize pricing throughout the year.

had historically sold 6-inch (15-cm) pinched poinsettias to a regional grocery store chain and to florists for \$5.50. However, other mass markets and retail garden centers were selling similar poinsettias for \$3.00 to \$4.00 each, and some of Chloe and Samantha's customers, feeling the pinch of competition, began to complain about the price they were charged (Table 2). Some buyers were threatening to place orders with other growers if prices weren't lowered. Market expansion was a remote option for Two Sisters Greenhouses due to transportation limitations. Geographically, they were at least half a day's drive to the nearest, larger cities.

Variable costs (or production costs) such as labor, plastic pots, chemicals, and cost of rooted cuttings continued to increase while wholesale prices for a finished product continued to decrease. Some fixed costs (or overhead) had also continued to increase, such as those attributed to energy, shipping, and insurance. Samantha always covered the variable costs and then paid fixed costs with what was left over from gross income; each year they managed to cover fixed and variable costs. In addition, there usually was some money left over, which Chloe and Samantha used to improve their greenhouses and increase mechanization. Both sisters also gave their employees a bonus at Christmas, which had helped retain loyal employees. However, in light of this emerging, competitive situation, it was time to make some decisions before this upcoming growing season started.

The decision

Chloe was looking at the 1998 order form for poinsettias (Table 3) and remarked, "Samantha, did you realize that we could save money by paying for our order early and save even more money by ordering early?"

"Yes," Samantha replied, "we have been saving money every year by getting a 2% cash discount on the price of rooted cuttings by paying the invoice within 30 days of the ship date (Table 3). We also save another 5% by ordering early. This has substantially reduced the cost of cuttings, but we have been using the profits from the previous year to make the early payment."

"Well, if we lowered our selling price according to the pressure of the market, would we be able to make an early payment next year?" Chloe asked.

"Yes, that is a possibility," Samantha replied. "But did you also notice that unrooted and callused cuttings were about \$15 to \$40 cheaper than rooted cuttings in lots of 100 (Table 3)?"

"Yes I did," Chloe answered. "However, there is a problem with growing unrooted or callused cuttings under the typically high temperatures [$\geq 90^{\circ}\text{F}$ (32°C)] in late summer and early fall. It inhibits root formation and can cause increased disease incidence, and we do not have the facilities to mist and cool the unrooted cuttings for rooting."

"I was going to suggest that we grow our own stock plants and save even more money on the cost of cuttings," Samantha said. "That would increase the growing season by ≈ 4 months, however it would require a shadehouse and a mist propagation area."

Chloe nodded, then changed the subject. "Do you realize that growers in our market area are spacing their poinsettias on 10 × 10-inch (25 × 25-cm) centers?"

"Yes I do," Samantha answered. "This may help them produce more plants at a lower costs, but I will bet you that quality suffers."

"Yes, they are usually very poor plants," Chloe replied. "I remember growing some poinsettias on 10 × 10-inch centers the first year we were in business. It was a disaster; in fact, most were discarded because no one would buy them."

"From an accountant's point of view, the decreasing spacing strategy

Table 2. Wholesale and retail prices for pinched poinsettias for 1996^z.

Container size (inches)		Price (\$)	
		Low	High
4	Wholesale	1.00	4.35
	Retail	1.99	7.00
4.5	Wholesale	1.10	3.50
	Retail	3.00	5.50
6	Wholesale	2.25	6.60
	Retail	3.75	15.95
6.5	Wholesale	2.05	7.50
	Retail	5.40	16.95
8	Wholesale	7.40	17.00
	Retail	12.95	30.00
10	Wholesale	4.00	20.00
	Retail	16.98	49.99
10, Hanging basket	Wholesale	11.50	15.50
	Retail	22.50	35.00

^zOsborne, 1997.

Table 3. Price list and ordering information for poinsettia cuttings.

Cultivar	Price/100 cutting		
	Unrooted	Callused	Rooted
Eckespoint Freedom family			
Red	30.00	54.00	70.00
Bright Red	30.00	54.00	70.00
White	30.00	54.00	70.00
Pink	30.00	54.00	70.00
Marble	30.00	54.00	70.00
Jingle Bells	30.00	54.00	70.00
Eckespoint Success			
Red	30.00	54.00	70.00
Eckespoint Snowcap			
Snowcap	30.00	54.00	70.00
Eckespoint Celebrate2 family			
Red	25.00	45.00	60.00
White	25.00	45.00	60.00
Pink	25.00	45.00	60.00
Eckespoint Novelties			
Candy Cane	30.00	54.00	70.00
Monet	30.00	54.00	70.00
Lemon Drop	30.00	54.00	70.00
Jingle Bells 3	30.00	54.00	70.00
Jingle Bells	30.00	54.00	70.00
Pink Peppermint	30.00	54.00	70.00
Peter Jacobsen's Pepride			
Pepride (Red)	30.00	54.00	70.00
Peter Jacobsen's Peterstar family			
Red	30.00	54.00	70.00
White	30.00	54.00	70.00
Pink	30.00	54.00	70.00
Marble	30.00	54.00	70.00
New Supjibi family			
Petoy by Peter Jacobsen (Red)	30.00	54.00	70.00
Pearl by Peter Jacobsen (White)	30.00	54.00	70.00
Darlyne by Gross (Pink)	30.00	54.00	70.00
Supjibi by Gross (Red)	30.00	54.00	70.00

Spring price list and important ordering information (Adapted from and used with permission from Paul Ecke Ranch, 1998).**Royalty rates**

- Royalty will be added to all patented and patent-pending cultivars. These cultivars will be grown under the appropriate license: Propagator-Distributor, Self-propagator, or Flowering Only.
- For Eckespoint Bright Red Freedom, Freedom Red, Freedom White, Freedom Pink, Freedom Marble, Freedom Jingle Bells, Success, Celebrate 2 Red, Celebrate 2 White, Celebrate 2 Pink, Monet, Lemon Drop, Jingle Bells 2, Jingle Bells, Candy Cane, Snowcap, Pink Peppermint, Gross Supjibi Red, Gross Darlyne, and Peter Jacobsen's Pepride, Petoy, Pearl, Peterstar Red, Peterstar White, Peterstar Pink, Peterstar Marble, and Peterstar Jingle Bells, the royalty rate is 4¢ per cutting.

Conditions of sale

- All prices are F.O.B. Point of Origin, payable 6 weeks before shipping, except for customers with approved credit.
- Prices are subject to change without notice.
- A 2% cash discount on the price of the cutting is allowed if payment is made within 30 days of the ship date.
- A 5% early order discount on the price of the cuttings is allowed on all orders placed by 1 Aug., if there are no changes during the 8 weeks before shipment.
- Royalty and freight are not subject to any discounts. Minimum quantity per cultivar for rooted product is 50 cuttings and orders must be in multiples of 100. Unrooted and callused cuttings minimums remain 100.
- Spring shipping season is 23 Feb.-15 June.
- For customers with approved credit, freight is prepaid by the Paul Ecke Ranch and added to your invoice as a separate line item. Airport-to-door service is available at an additional cost.
- Paul Ecke Ranch warrants, to the extent of purchase price, that all cuttings are sold true to name and as described within recognized tolerances. No further warranty, expressed or implied, is given and under no circumstances will we ever be liable for more than the invoice value at time of purchase.

sounds great, but let's be realistic here!" Samantha said. "The combination of a lower-quality plant and an increasing proportion of sales through mass merchandisers has contributed to the continual price erosion!"

"Unfortunately, this inferior poinsettia is becoming an industry standard," Chloe replied.

Chloe looked at the order form again and became overwhelmed by the long list of cultivars, saying, "We have always grown the most popular types of poinsettias on the market and shied away from the new and unusual cultivars."

"Yes, but there are so many new cultivars on the market, just keeping up with the different variations on reds, pinks, and whites is next to impossible" Samantha replied. "How are we supposed to know which new cultivar will sell?"

About that time, Freedom, the greenhouse cat, sauntered into the room. "Maybe we should let Freedom decide," Chloe said.

"Why don't you ask some of our buyers?" Samantha asked.

"That would be a good idea," Chloe admitted, "but I won't ask all of them. I know which buyers complained about our prices last year and which ones did not. I also know that poor quality typifies the other products sold by retailers who complained. I wonder if it is a good idea to have our superior poinsettias from Two Sisters Greenhouses next to their inferior, lower-

priced flowering pot plants.”

“Maybe we should just stop selling to the retailers who were complaining,” Samantha said.

Chloe liked that idea, but wondered how they could replace any lost customers. Should they expand their shipping area? That would mean expanding their delivery responsibilities and possibly purchasing a larger truck. Chloe was already too busy with growing and transporting all the plants to the existing customers. Should they try to get into the mass market and sell low-quality plants like some of the other growers? Maybe they should consider growing some other crop.

“One option would be to stop growing poinsettias altogether and only produce bedding plants and perennials,” Chloe said. “Both are popular almost all year and seem to be growing in popularity with the demand for landscape color. However, the bedding plant industry has become somewhat crowded in the past few years.”

“But aren’t the poinsettias the best plant to grow in the off-season?” Samantha asked. “Plus the poinsettias help keep us in contact with our buyers, helping maintain orders for spring bedding plants. What would our employees do in empty greenhouses? You know we must employ them full time or they will quit.”

All in all, total sales at Two Sisters Greenhouses were comprised of 60% from bedding plant sales sold May through July, 30% from poinsettias sold November through December, and ~10% from garden mums sold August through September.

Chloe and Samantha pondered over what other alternative crops they could produce during a season that was dominated by one plant. There were many other questions left unanswered and many decisions that needed to be made very soon. Will the Scrooge ruin Christmas this year or can Chloe and Samantha make some changes that will maintain this young and successful greenhouse operation?

Interpretive or teaching note

This decision case was designed to help students understand critical management aspects of the horticulture industry.

Growers are faced with many issues other than those pertaining to production. They must decide how to market their product and make enough profit to justify growing the crop. The decisions that Chloe and Samantha make will be made as a team because both have an equal stake in Two Sisters Greenhouses. Therefore, dividing students into teams of two is suggested for this case study. Suggested issue-oriented questions for this specific case include the following:

- Can Chloe and Samantha cut their production costs?
- Is the wholesale price they are charging their customers unreasonable?
- Should Two Sisters Greenhouses start their own propagation facility and sell poinsettia cuttings and finished plants?
- Should Chloe and Samantha grow more plants at a lower quality and sell for a lower price?
- How would they find out about the newer poinsettia cultivars and cultural requirements?
- Should they change their marketing strategy by dropping some customers and including others?
- Should Chloe and Samantha try alternative crops?
- If they do try alternative crops, should they stop growing poinsettias or grow poinsettias in addition to other crops?
- What else could Chloe and Samantha do to retain the current profit margin and still produce a quality product?

Literature cited

- Ball, V. 1994. Poinsettia travel—'94. *GrowerTalks* 58(10):20–21.
- Hummert International. 1995. 1995–96 Commercial catalog. Hummert Intl., St. Louis.
- Osborne, L.S. (ed.). 1997. Winter/spring crop pricing report. *Greenhouse Business* 3(1):16.
- Paul Ecke Ranch. 1998. Spring price list and important ordering information. Paul Ecke Ranch, Encinitas, Calif.
- U.S. Department of Agriculture. 1996. Floriculture crops 1995 survey of floriculture crops. Natl. Agr. Stat. Serv., Washington D.C., Sp. Cr. 6-1.

The Greenhouse of the Future: Using a Sponsored Competition in a Capstone Course

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ADDITIONAL INDEX WORDS. active learning, education, undergraduate research, critical thinking

SUMMARY. Horticulture students often lack practical experience integrating information from diverse sources to solve complex real-life problems. Capstone courses seek to remedy this by giving students an opportunity to demonstrate a range of workplace skills such as teamwork, effective communication, and critical thinking. Sponsored competitions provide educators with an active-learning framework into which the goals of a capstone course can be developed. The Greenhouse of the Future competition allowed undergraduate students to conceptualize, develop, and prototype innovative greenhouse designs in a national competition venue. This article explains the guidelines of the Greenhouse of the Future competition and discusses how the competition was integrated into the capstone course *Greenhouse Management*.

Horticulture employers seek graduates who exercise sound judgement and make reasoned decisions when faced with complicated dilemmas. According to a University of Nevada-Reno College of Agriculture survey (1989), employers need individuals skilled in problem solving and logical

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