

Cut Flower Production

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Proceedings

These notes provide information, discussions, and questions and answers from the course that are additional to the printed materials provided to participants (enterprise manuals, presentations, and other resources).

DISCUSSION:

• History

Pam and Frank Arnosky have come a long way since they first pitched a tent in the middle of a cedar break in central Texas, on the 12 acres of owner-financed, rough ground they bought. At the time, they had two children, a four-year-old and an eight-month-old—and \$1000 in their pockets. Since Frank had a degree in horticulture and a background in bedding plants, they began their venture by growing bedding plants. In 1992, Pam tried a quarter-acre of cut flowers in front of the house. At that time, not much information was available on growing cut flowers—the Association of Specialty Cut Flower Growers (ASCFG) was just getting started; their best references were publications from the 1920s when locally-grown cut flowers were still being produced. For the first five years they were on the “pay-as-you-go plan,” with a rototiller and a wheelbarrow. They also built a small house and greenhouse. Their kids (they now have four, all home-schooled) have always been involved in all aspects of the farm’s development, and have earned their spending money by working on the farm.

Eventually, they bought two other pieces of land to grow on, an 8-acre and a 12-acre piece, and kept growing the business little by little. At some point, though, they realized that “in order to make any money” they were going to have to get a lot bigger. They leased a 15-acre field three miles away, with the idea that they could grow on it and use the money earned to buy a larger piece. Four years ago, they bought 100 acres three miles away at the corner of two state highways. As of 2007, they are growing about 40 acres of cut flowers spread between three locations.

The cut flower business grew exponentially for about eight years. This was possible because their initial marketing outlet kept adding store after store, and they would bump up production in response to the added markets. When they would show up with their flowers, folks would say, “Where did you get those? These are beautiful!” Incredulous that the flowers were being grown

right in Texas, the buyers would tell them they wanted all that they could produce. The second year in business, Central Market opened—a high-end grocery store with an enormous European-style flower section. Knowing that Central Market wanted to focus on Texas-grown and locally grown, the Arnoskys went in to propose growing flowers for them. Central Market’s response was “Great idea—prove it.” There was the concern that the flowers be produced consistently, matching commercial standards; and that the Arnoskys could in fact produce the volume required for a large grocery store chain.

Pam and Frank decided to give it a try. Initially they took in about 35 bouquets; and by the end of the first season, bouquet sales at that store were about 350 per week. Then Central Market’s parent company (HEB) called, wanting more. So every time Central Market added a location, they’d bump up production, because it was a sure bet. HEB has 350 stores, but since all the Arnoskys’ bouquets must eventually pass through their hands at the bouquet-making table, they have kept production at a level where they can continue to monitor for best quality.

As the farm grew, so did the equipment needs. (At the time of the Southern SAWG 2007 conference, they had just bought their first transplanter.) Transplanting and weeding have been done by hand, since the close crop spacing makes mechanical cultivation problematic. Transplants are used whenever possible to get a jump on weeds, and the equipment list is short: tractor, tiller, discs, furrowers. The greenhouses are their most important pieces of equipment. Frank says that you should always assume that you need twice as much as you think, because the minute you get a new cooler, greenhouse, or tractor, you already need a bigger one!

After some time as wholesale growers, they began to feel a bit too removed from the customer base, and wanted to pull people out to the farm, partly in response to requests to visit the farm. And usually the visitors wanted to buy something. Two years ago, they built a 20’ x 20’ open shed for an on-farm market, which is open Saturdays, and self-serve on Sundays and Mondays. They are selling their own vegetables, flowers, and eggs, and offer locally made goat cheese, raw milk cow cheese made by friends, bedding plants, potted perennials, and fruit trees. The idea for the long term is to eventually pull back from the wholesale business somewhat (to “get off the rat race”), and become more of a family *destination* farm. Having the on-farm market gives store customers a place to come to visit and meet them, putting a face on the farm and farmers.

In the fall of 2006, they built a big new barn at the new farm site. At the site there are 20 acres in cultivation plus 50 acres of live oak and cedar forest. The dream is to make the site available for hiking, mountain biking, camping, maybe eventually some food and “a little beer joint.” The location is about 45 minutes from Austin and 55 minutes from downtown San Antonio, right in the heart of the Texas Hill Country in a small county (Blanco) with only about 8,800 people. In an area where ranches are being chopped up into 20-acre parcels, the Arnoskys hope to influence the cultural development of their area by acting as a networking center—helping people meet each other and provide an example of sustainable living in the country.

● Industry Overview

“Before you grow it, answer the question: Where can you sell it?”

Where are grocery store bouquets coming from, anyway? They are coming from the big flower growers in Venezuela, Columbia, China, and Kenya. The flower industry in the U.S. has gone through a series of evolutions, having come around full circle. New growers can take advantage of this by being aware of what was being grown

in the early 1900s in the U.S. Back then, you’d typically find a florist with their own greenhouse and 2-3 acres of growing space on the edge of a city. These florists would grow potted crops, cut flowers, and sell bulbs and planting materials. If you needed a bouquet, they’d go into the greenhouse to snip carnations and sweet peas, or go to the field and cut phlox and zinnias. Everything was pretty much grown locally. Then, some folks began to specialize in carnations, etc. to sell to the florists. With the advent of refrigerated shipping, places like California and Colorado began to grow items that held up for shipping (carnations, chrysanthemums, roses). Thus, we began to move away from specialized, local production to these shippable species. These three species came to the top because you can cut them, put them in a cooler for three weeks, ship them across the country, and store them again for a while before final sale—and they still hold up really well. Breeding efforts began to move in the direction of storability and shipping ability. Unfortunately, fragrance was often lost as these other breeding objectives were pursued. Fragrance compounds are actually those that promote ripening and cause the flower to “go down.” Generally, the less fragrance, the longer the flower will last.

Meanwhile, as the California and Colorado growers became good at this, the Ecuadorians were realizing that if you could ship from California, you could ship from South America (and Holland...). Eventually, the domestic growers lost most of their business to overseas growers. After years and years of seeing primarily carnations, roses, and chrysanthemums, however, the domestic consumer started looking for something different—something that looked more like garden flowers. And who can grow these and move into this market? **We** can! (Frank notes that about the same time that the ASCFG was getting started, specialty cut flowers were starting to appear in grocery store bouquets, because the Columbian and Ecuadorian shippers were figuring out which species would ship well.) Companies like Floralife and Pokon & Chrystal have also been active in research into floral preservatives to extend the vase life of specialty cuts, extending the repertoire of locally grown flowers that can be used commercially.

Today we have a situation where many people, especially floral designers, no longer want roses and chrysanthemums, but they want specialty cut flowers like lilies, zinnias, and sunflowers. Local growers can fill a niche market by growing items that do not ship well and selling them to local wholesalers, florists, and at farmers’ markets. The demand is **there** for locally grown flowers.

Wholesalers generally ship to another regional floral wholesaler in a city somewhere. The regional wholesaler then ships to retail florists who sell to the final customers. You can sell product to a regional wholesaler, but the price to the grower is generally low. Also, if your brand is on your product at that level in the distribution system, you’ll often lose it at that point, since your product will be thrown in with everyone else’s. The Arnoskys sell to several top-end retail florists in the Austin area, which they don’t really need to do because of the wholesale accounts,

but they enjoy the fun and information they get from selling to these passionate flower lovers. You can get a better price from the retail florists, bypassing the wholesale supplier's markup. The problem with retail florist accounts, though, is deliveries with multiple stops. Also, the retailers are often not fast to pay. The florist business is up and down—don't show up during Valentine's week (the busiest season of the year), or in August when business is dead.

The Arnoskys used to send out a fax on Monday mornings to let florists know what they'd have available that week, not wanting to go door-to-door with flowers that weren't pre-sold. Currently they've created a climate of exclusivity by selling to only four retail florists, and Pam has convinced them to let her do the product selection—she let them know that she really was too busy to “nickel and dime” the sales. She has them let her know what they really can't sell so that she can change the product selection. Two of the accounts take \$200 worth per week and other two take \$100 worth. She's had to work with them to get to that point, and not selling to them for a period of time made the florists *really* want the flowers. Pam let them know that because of their huge wholesale business, they really couldn't fill orders for three bunches of zinnias. So they were offered a minimum drop shipment, with the Arnoskys choosing the product mix. The florists have learned to trust that they will not receive numerous bunches that they cannot use. If they receive them on Wednesday, they know they'll be able to sell them out through the weekend.

The retail florists want the best; filler items can be had from the wholesalers really cheaply. The florists will take \$3-\$4/stem oriental lilies, whereas these same lilies may not bring as high a price at the farmers' market. When there is only a small quantity of a special item, it goes to the florists, and they appreciate it. Occasionally people call to find out which florists they can use that will be using the Arnoskys' flowers. Although retail florists only account for about 2 percent to 5 percent of overall sales, it gets their name out. This is true for the on-farm market as well, and they encourage folks to come out to the farm—but they don't expect those sales to have a major effect on income just yet.

- **Branding**

Everything is branded, branded, branded. Why? “The importance of getting the business name out there over and over is that people forget about you instantly.” And Frank explained that since we are all proud of our work, we want it to be known that we are not just producing an agricultural commodity. We want to put our identity on the products to set them apart. In Texas, “it's shootin' rats in a barrel” to sell Texas-grown products. They started branding as *Texas-Grown* in 1992 and now have good name recognition. Every bucket that goes to the grocery stores has the Texas Specialty Cut Flower (TSCF) label with the logo. The logo was created from a pencil drawing Pam and Frank did and handed to some computer design folks who did labeling for agricultural products. The design idea was “California fruit box label.” (Dover Press has several books of produce label collections.) Since we are a media-saturated culture, Frank observes that there is “no such thing as bad press.”

- **Grocery Store Sales**

In the center of the Central Market floral section containing their flowers is a big *Texas-Grown* sign. The Arnoskys have about 25 percent of the total floor area of the floral department, a big investment on the store's part. Floor space is the premium value for the stores, and they want to know what the return per square foot per minute is, for maximum profits. When they were given this kiosk in the floral department, it was their job to keep it full. One key thing to keep in mind when selling to a grocery store is: you do not sell flowers to a grocery store. The grocery store sells flowers, and it is your business to provide flowers for the grocery store to sell. Thus, the grower must provide a mix that will SELL. Never sell on consignment to stores, since you can never be guaranteed that the store staff will take care of your product. Actually, the floor staff are the most important people in this chain, since they act as the final sales representatives for your flowers. Often the lowest paid people in the store, they are the ones that can say, "Do you know that we carry locally-grown flowers—they're the freshest thing we have!" Work on educating those people to be passionate about your farm and its products. Otherwise, your sunflowers are just the same as the Ecuadorian or California sunflowers. You can observe on a store-to-store basis who is passionate about locally grown and who is not. In 2006, the Arnoskys sold to eight Central Market stores, fourteen Whole Foods Markets, and around twenty HEV stores. When sales to this many stores became cumbersome, they decided that they would sell to those stores who were most passionate and where sales were the highest. Now they are not afraid to say, "I can't work with that manager; we've tried our best, and we can't sell to that store." This may come as a bit of a shock to a final buyer who's used to checking off items as they come out of a box from Miami.

The only time you have quality issues (if you are a local grower who is doing a good job) is when you have floor staff who don't know what they are doing. When Central Market, their exclusive buyer for some years, began expanding rapidly and floor sales began to decline due to poor handling and uneducated staff, Pam and Frank decided to start selling to Whole Foods—which had been courting them for years. Central Market was unhappy about this, even though TSCF provides them about \$500,000 worth of flowers per year. In November of 2006, the Arnoskys told Central Market that they quit, and walked over to Whole Foods. (Central Market's parent company, HEV, kept their business.) Central Market had been over-buying for their stores and not educating the floor staff properly, so bouquet pile-ups were frequent. Date coding allowed Pam and Frank to see that some bouquets were being held for 1-2 weeks, and when customers buy these, they don't hold up, and the customer stops buying local cut flowers. Since they had branded their flowers for ten years, when they switched stores folks recognized their product and knew what to look for. In the meantime, Central Market courted back some of their business for 2007. When they left Central Market, TSCF was their #1 vendor for floral sales, having the least *shrink*, or unsold product that must be discarded.

Branding your product means customers will walk into a store and ask for it by name—*pull-through marketing*. This changes the dynamic of the relationship between grower and produce buyer, who may not even like flowers or want to give you your price. You are no longer just a commodity, but an *identity*. There are a zillion bouquet makers out there, and the bouquets are cheap, coming in from Ecuador or California or Holland. But there is only one TEXAS bouquet maker. The Arnoskys are aware that their bouquets have been shipped out to be copied....it turned out that a store marketing "country bouquets" that looked just like theirs had shipped some of TSCF bouquets to a bouquet company in California to replicate. Asked if they'd ever

had to compete with other Texas flower growers, the Arnoskys replied, “Yes, and we’ve educated every single one of them at our farm.” Since growing is difficult in that area, most of the time the competitors fall out after two to three years.

Grocery store sales are 95 percent of TSCF sales, over 100,000 bunches per year. The remainder of sales is to florists and at farmers’ markets. The industry standards were learned by visiting and studying wholesale suppliers—how they packaged and sleeved. From the beginning, they have put their logo on their sleeves (the retail florist began to ask for the TSCF flowers by name from the wholesalers). The packing standards at the wholesale florists are the same packing standards they use for the grocery store accounts. Retail florists can be one of the best sources of information—wholesale price lists, bunch size, etc. Frank’s advice is to buy flowers for yourself to see bunch size, price, and vase life. “Enjoy flowers—the best from the field should go in your house.”

Flower buying is an impulse business. People see them and they’re drawn to them. Part of this draw is how they are presented in the bucket and in the sleeve, so we are talking about *perceived value*. Farmers’ market growers beware. Don’t display zinnias cut at different heights and all askew in a coffee can! Presentation is extremely important--find out what the industry standards are.

Pam and Frank stated that although some growers brand their sleeve, they do not. Also, they are using perforated sleeves, which breathe somewhat. Be sure to keep the sleeves up out of the water, since they can wick up moisture and cause the stems to mold. Corn-based sleeves are available, but for now are made of genetically-modified corn starch. When they become available as a non-GMO product, Whole Foods will have them switch to the corn-based sleeves. Generally, TSCF works with the various stores and packages the bouquets using the store’s sleeves. (Sleeves are available from A-ROO and Tempkin. Keep a good relationship with the accessories suppliers. Another important supplier for TSCF is AgriTech, a greenhouse supplier, brokered through Gloeckner.)

● **Production Techniques**

About all the Arnoskys had for equipment when they got started were a wheelbarrow and a rototiller, clearing the first 8-acre field of 20-year-old cedar to begin production. Wanting to make the most of this space, everything was intensively planted. Even though they’ve expanded into two other fields, they are still using these intensive planting techniques. All crops are planted in 48” wide permanent beds—the current 3-point tiller is 51” wide. The only other tillage equipment used is a disc for chopping in organic matter, a shredder, a chisel plow for breaking up hard pans, and a manure spreader for dressing the beds with compost. Paths at the new farm are about 18” wide; Pam says that growers need to consider row cover widths when planning beds and aisle widths. Most beds have four lines of plants, one foot between the rows, with various in-row spacings (depending on the crop, some beds may have only two or three rows). They try to maximize planting density without creating crowding or disease problems, and this close spacing both helps to control weeds and helps flowers grow more upright for straighter stems.

Aisles between the beds tend to stay in a permanent cover, which is mowed or trampled down. The farm is very weedy by intention; weeds function as beneficial insect habitat. Transplants are used to get a jump on the weeds and outgrow them. Direct seeding is problematic because grasshoppers devour emerging seedlings. Grasshoppers eat transplants too, but usually just take bites out of them without killing them. Transplanting so far has been by hand, but they have recently purchased a Mechanical Transplanter (made in Michigan), a #5000 celery transplanter. What is needed is a transplanter that can plant crowns of the plants level with the soil level, not below, like many vegetable transplanters do. Delphiniums and statice, for example, are very sensitive to being set too low. Also, they needed a transplanter that could plant four rows with a 6" in-row spacing. The celery transplanter will allow them to plant rows 1 and 3 on the first pass, up to 5" apart in the row; then rows 2 and 4 on the second pass. The work crew is getting older and so much hand transplanting can be hard on the knees. (A farmer in the audience remarked that a water-wheel transplanter can plant three rows in a bed with a 6" in-row spacing). The most commonly available mechanical transplanters are Holland (Michigan), Waterwheel (Pennsylvania), and Mechanical Transplanter (Michigan). Market Farm Implements in Pennsylvania is a good source for transplanters.

Cover crops are not worked into the system much because most beds are always in cultivation. For instance, 7,200 Superior Sunset sunflower transplants must be planted per week for about 28 weeks out of the production year. Typically, a crop will all be harvested at the same time, and it is immediately mowed, chopped back into the soil, the soil re-fertilized if needed with cottonseed meal, and replanted—sometimes all in the same day! About 25,000 transplants per week must be put out in the summer months. Although there is not a formal rotation schedule, some items that are particularly sensitive to root diseases (Ranunculus family plants like delphinium and larkspur, for instance) are rotated as much as possible. Sunflowers, because of the volume of plants cultivated, sometimes go right back on sunflower ground. Frank has a good idea of what's been where, and can adjust plantings as needed.

● **Fertilization**

The soil on the Arnosky farm has a very high pH, up to 8.0, and an alkaline soil like this really eats up the organic matter. For many years they fertilized with turkey litter compost prior to every planting, and some beds may have up to four crops per year. Because the price of the compost has gone up, they've pulled back on using it and use it mostly on new beds. Now they are using cottonseed meal, which has 6 percent N content, and is acidifying. Their research into pesticide residues on cotton has led them to believe that the cottonseed meal has a low residue factor. This is not an allowable input for certified organic operations, but their farm is not certified even though it is managed organically. Organic cottonseed meal, although available, is cost prohibitive to use as their fertilizer, since it is used as an animal feed in organic dairies, which drives the cost up. They are using cottonseed meal at the rate of 50 lb. per 800 square feet (4' x 200' bed), applied prior to each crop by hand and tilled in.

There is no cultivation equipment for weed control, although the aisles may get a tilling if they start to "get too crazy." Weed control is primarily through tight plantings that out-compete weeds.

- **Greenhouses**

Greenhouses are very important in this business so that you can grow your own seedlings. The Arnoskys are growing out 25,000-30,000 plug transplants per week in the summer. Frank's bedding plant production background has come in handy in that part of the operation. Most seeds are sown into plug trays and transplanted directly to the field—they avoid starting seeds in smaller containers that require “bumping-up” into a second container for growing out to field size—although this is not always possible. Their main transplant production poly greenhouse from Stuppy's measures 30' x 96', and has evaporative cooling pads on one end. There are also some 20' wide houses where plugs can be held prior to transplanting. Frank really likes his Resnor propane heaters, and is using a 225,000 BTU unit for a bedding plant production greenhouse, and a 165,000 BTU unit in a 20' wide greenhouse. The Resnor heaters may only be available from local heating supply dealers; Modina is the brand usually supplied by greenhouse companies. The Arnoskys have been using their Resnor for some fifteen years without any problems.

All the plug trays are seeded with a vacuum seeder, which Frank calls “one of the best investments you'll ever make.” He is using a Berry Precision Seeder made in Elizabethtown, North Carolina, which he bought for \$1100. This came with four interchangeable plates. The plates can be manufactured specially to match whatever plug trays you are using at a cost of between \$75-\$200 per plate—depending on how many holes are needed. Frank said this machine quickly paid for itself. The basic procedure is to sprinkle the seeds onto the plate, turn on the vacuum, shake to distribute the seeds on the plate, flip the tray over on top of your filled plug tray, then turn the vacuum off to allow the seeds to drop onto the plug cells. They are using about eleven different trays; four of them are the most common: 392, for items like lisianthus or snapdragons that will have to be bumped up to larger cells; 128 and 200 (these plugs will transplant directly to the field); and a 72 and 128 with big holes for sunflowers (also transplanted directly to field).

The heating bench is useful for providing bottom heat to seedlings in the cooler months. They set up a simple heating bench using a 150' heating cable (distributed by Gloeckner) placed on an insulation board, onto which overturned 1020 flats are placed. The seedling flats to be germinated are then placed on top of the overturned flats. This set-up is described in the January 2007 issue of *Growing for Market*. When covering seeds, they will use their regular soil mix, Fafard #2, for those items that need dark to germinate, and vermiculite for those that need light. Some seeds need dark, some need light, and some don't care—generally, the finer the seed, the more light needed.

Frank is the sole vacuum seeder operator, although he'll sometimes farm out the sunflower seeding to his son or an employee. Usually, though, his son will bring in trays to be seeded and take them away when seeded. The vacuum seeder was one of the first purchases they made.

- **Outdoor Field Production Cycles**

The Arnoskys use two basic field production cycles: the over-wintering, fall-planted annuals and perennials (many treated as annuals); and the spring/summer planted annuals. The fall planted items include larkspur, snapdragons, centaurea, agrostemma, and delphinium. These are planted out in the fall and over-wintered under polyester row-cover, since their part of south Texas can experience extreme weather fluctuations in winter. All of these species bloom in April, and after bloom are mowed down and the bed planted to summer annuals. Delphiniums are an example of perennials that are treated as annuals—planted in October, and taken out after flowering in April and May. Snapdragons are planted both in October and January. Since temperatures are too warm in early fall to start these snap and delphinium seedlings, the snapdragon plug production is farmed out to a local greenhouse producer, and the delphiniums are bought in from California.

The summer annual seedlings like zinnias, marigolds, celosias, and sunflowers are propagated in the greenhouses in early spring so that they are ready to go as soon as the over-wintering annuals have finished—sometimes the same day. The labor force arrives March 1, ready to plant. Back-up plants are usually ready in the greenhouse for late spring frost disasters: a good insurance policy.

Planting system: Each 4' wide bed usually has four rows of crop plants, with drip irrigation tape in each bed. Drip irrigation is a must since 3-4 week dry spells are common in summer. Drip irrigation consumes less water, a big issue in Texas, and the drip puts the water right where it's needed instead of on the paths growing more weeds. Very little hand weeding is done since the beds are so thickly stocked. Greenhouse beds may sometimes have as many as 8-10 rows per bed. Outdoor bulb crops are planted 3 rows per bed in furrows made by the tractor furrower (a chisel plow with furrowing tines attached). Dutch iris, tulips, and lilies are planted this way. For flower crops that will require support, Horto-Nova brand polypropylene floral netting is used, supported by T-posts. These T-posts do double duty in winter when used to weight down the edges of row-covers. After use, the Horto-Nova is rolled up and stored out of sunlight, and will last two to three years.

● Pests

The #1 pests on this farm are the neighbor's cows! Otherwise, pest problems are few. There are plenty of weeds for beneficial insect habitat. Dipel and Conserve are the primary natural pesticides used, and only for a particular pest they have on amaranth-family plants in late summer. Aphids on leaves are occasionally washed off with water. Thrips come every spring (from native wildflowers), and the crops they like have been discontinued—blue lisianthus and Shasta daisies. Their experience has been that migratory thrips are extremely hard to control—not only are they too small to see, but they bite. They found sprays ineffective, since the thrips just continue to migrate in.

● Winter Production

Winter production is in unheated high tunnels, using crops that like cool, short-day conditions: anemones, ranunculus, Iceland poppies, hyacinth, Amazon dianthus, snapdragons, Asiatic lilies, and sweet peas. They recommend that folks further north use minimal heating, i.e., 35-40 degrees to protect their winter crops from damage. Ranunculus and anemones are particularly

successful, and are grown in 20' x 144' Agritech coldframes. Some of these tunnels are accessed only with walk-behind tillers, others have doors on either side of the house that will allow a tractor to be driven in and out. Ranunculus is planted in 4' wide beds with four rows per bed, 6" in the row. If temperatures dip into the low teens, row covers are put over everything inside the houses. Ranunculus can freeze solid at 25 degrees and the bloom will still be fine. Sweet peas are hard to cover and must be kept above 26 degrees. Hyacinths are grown in bulb crates, 60 per crate.

Since the main labor force leaves at the end of October, the winter production work is done by Pam and Frank, their four children, and one live-in intern. Sometimes two local laborers are brought in to assist with the winter work.

- **Labor**

In early days, the Arnosky family did everything by themselves. Soon they began hiring local folks, and many times it seemed that the local people available to work were not very interested in fieldwork, or were unreliable. Eventually they found out about the H2A (seasonal agricultural worker) guest worker program. This program is managed by the Department of Labor, and host farmers must apply and be certified by them. The application, certification, issuance of visas, etc., is a long and complicated process, which must be completed each year by the host farm, but it has worked so far for the Arnosky farm. Growers should expect to educate themselves in language skills and about the cultural differences inherent in using H2A workers.

Housing for the workers is inspected by the Department of Labor. The grower must provide housing, carry workers' compensation insurance, and pay for the workers' travel expense to and from their home country. The wage rate is mandated at \$8.32/hour for up to 55 hours per week, at which point overtime rates kick in. Their workers are not allowed to work more than 55 hours per week.

The Arnoskys' children help in the greenhouses, making bouquets, and at the farmers' markets, which Pam says makes for great public relations. They have not relied on interns much for labor, because their experience has been that interns may not be interested in the type of exacting work schedule required of a high-volume business. WWOOF (World-Wide Opportunities on Organic Farms) volunteers are generally accustomed to a much more laid-back schedule than the Arnoskys keep.

Frank is the direct crew supervisor, and has never yet found anyone that he could trust enough to take over the job of manager. The speed at which the workers work is the pace set by the Arnoskys themselves: "People are only going to do what you expect of them." So the Arnoskys model the work and pace when the crew is learning new tasks. H2A workers are only allowed to work at the sponsoring farm, and this is specified on their passports. They cannot legally work for any other company—the host farm can be fined or lose their certification if they allow this. If a worker leaves the farm to get another job, it is the responsibility of the farmer to notify the Department of Labor, which releases the host farm from any responsibility for the worker. A worker who goes AWOL from the host farm will never again be able to obtain a visa.

Q. Why are there no women workers?

A. Since the State Department does not allow whole families to come to work (children must stay at home), this complicates the situation. Mexican men (the Arnoskys' current work force) often want to have separated work tasks from Mexican women, another complication. Thirdly, the Arnoskys have only bunk housing for the work crew at the moment, so the most practical thing has been to have all-male crews.

When there have been health issues with the Mexican H2A workers, the Arnoskys have taken care of them. Pam notes, however, that these guys never get hurt. Another advantage is that the Arnoskys do not have to pay payroll taxes on the H2A workers' wages, since they will not receive either unemployment or social security payments. After one former American employee filed for and drew unemployment benefits for six months, the Arnoskys' unemployment insurance rate went from 0.96 percent to 6.9 percent of wages for any American employees. Later, they were counseled that if they suspect that they may have to fire someone, to do it in the first month of employment to avoid the repercussions of the employee drawing unemployment. If they hire American employees, their actual cost is about 15 percent above the stated hourly rate—when all the FICA, workers' compensation, and employment taxes are added in.

- **Varieties**

Pam and Frank shared their flower variety list with the Southern SAWG Short Course participants, and the complete list is included in the cut flower enterprise manual. What follows are miscellaneous—and important—cultural comments that came up as we went over that list.

Daffodils—the variety 'Ice follies' has a low-chill requirement, important in south Texas.

Tulips—are grown by the thousands, mostly in bulb crates (60 per crate). These come pre-chilled, and are called 5-degree tulips. They have been chilled by the supplier for nine weeks at 5 degrees Centigrade, and must be planted in cool soil.

Dianthus—The "Amazon" series is grown all summer, is a true annual, and will not produce seed. The 'Sweet' series must be treated as a sweet William (flowering early spring), and is too short when grown into the summer.

Delphiniums—The Belladonnas and Pacific Giants are bought in for the October plant-out, and seeded in their greenhouse in December for January plant-out.

Larkspur—direct-seeded in October and January with an Earthway seeder (onion or cucumber plate). 'Cloud' series used for filler.

Ageratum—needs plenty of water, sometimes gets aphids.

Asclepias spp. and snow-on-the-mountain have caustic sap, so beware—be sure not to touch your eyes or skin if you have been handling them.

Ammi visnaga should be pinched when 1' tall, and use OVB hydrater when cutting.

Good varieties are Queen of Africa, Casablanca, Green Mist.

Gold coin marigolds—pinch at 8” to get five to eight very tall stems. They expect to get only two to three cuttings, and plant weekly for a continuous supply. A workhorse for bouquets (three stems marigold, plus gomphrena and sunflowers for a nice summer bouquet).

Tuberose—use only the single; double variety not reliable.

Dahlias are not good for the South—cut into hot water, OVB. Susceptible to thrips.

Agrostemma—related to dianthus, difficult to harvest, nice wildflower look.

Campanula—somewhat difficult, and fragile.

Dutch iris—unchilled bulbs planted in November; chilled bulbs planted in Jan and early February and come on a tad later.

Trachelium—they order in the plugs.

Basils—pick very early in the day or late in the evening.

Celosia—the “supercrest” variety from Gloeckner has a large head, tall stem, long crop time.

Chrysanthemum—cut flower mum varieties from Yoder.

Gomphrena—cut entire plants, especially bicolor rose. Only the globosa gomphrenas can be treated this way; the Haageana gomphrenas in orange, red, and carmine colors must be cut as individual stems.

White popping sorghum very popular, and can be pinched.

Sunflowers—they only grow Superior Sunset, planted 1’ in row for large heads, 6” for bouquet flowers

Zinnias—eight stems of Oklahoma zinnias plus one entire cinnamon basil plant yields a \$3.65 wholesale bouquet: you can make 100 of these per hour.

Winter greenhouse variety notes:

Anemones—they get six to eight weeks of production from these.

Iceland poppies are brought in as plugs, Temptress series.

Ranunculus—The Labelle series sells for \$.50/per corm and produces about 10 stems at a value of \$.70/stem. In their 144’ greenhouse, a total of 21,000 marketable stems were harvested in one winter season, making it the “hands-down highest return per square foot on the farm.”

Lilies are planted mostly in crates, 25 per crate.

Hyacinth are planted 60 per crate after pre-chilling for twelve weeks,

“French tulips” are the late varieties they grow in crates, 60 per crate.

Callas—check out goldstatecallas.com for the best cultural info. They are expensive to grow and quite prone to disease.

- **Bouquet-making and post-harvest handling**

After all the effort of production, flowers must be handled properly. Every week, all the buckets are washed on one day, by hand, for the entire week, with detergent and a chlorine dip (1/2 cap bleach per 15 gallons of water for rinse water). “Cleanliness is godliness in the flower business.” Bacteria in the stem is the #1 cause of flowers wilting—they physically plug the stem. If you are dealing with a wholesaler, check their buckets, and if they are dirty, “Don’t deal with them.”

Flower harvest is with #2 Felco pruners, and everyone gets their own pair to keep track of. Make sure dirty buckets always go one place and clean ones another place. Do not put flowers on the ground. They will pick up dirt.

In the Arnoskys’ system, usually three pairs of workers go out to harvest; one pair will cut opposite one another. These *cutters* hand flowers to a *carrier*, whose job it is to keep buckets filled with OVB in the correct concentration and run around picking up everyone’s handfuls, put them correctly in the buckets, and take them to the shaded box truck that goes into the field. This carrying job is actually the most demanding, requiring one carrier working per five pickers.

OVB is a hydrating solution for summer flowers, made by Pokon and Chrysal. This is the solution that is picked into in the field. Flora-life’s product name is Hydraflor. These hydrating solutions lower the pH of the water and are soaps, reducing the capillary tension of water. These work great, especially when cutting tall stems like larkspur and delphinium in hot weather. OVB is used for everything that is cut in the field EXCEPT zinnias (if zinnias are cut into OVB, they must be removed within an hour because they will over-hydrate and stems bend irreversibly). For other species, stems are cut into OVB in the field, and can stay there until processing. (Hydraflor is more concentrated, and stems can only stay ½ hour before being transferred out of the solution, or petals can be discolored—especially if there is wind.) The Arnoskys do not use “quick-dip” products.

Floral Preservatives, and there are many brands, contain three components. The first is a sugar, food for the opening bud. Second is citric acid to acidify the water, which helps plants to take in water more rapidly. Third, since sugar creates a food for bacteria, a bactericide is needed to prevent bacteria from growing in the cut stem or in the solution. This is usually a quaternary ammonium compound or a chlorine-based compound.

Holding Solutions, like Chrysal Professional #2, contain less sugar and more bactericide, and are used for holding flowers in the cooler and preventing rotting from bacteria. This is especially used for flowers that are shipped since it will not cause them to open so fast. The Arnoskys use a 33 gallon container of holding solution concentrate, fitted with a 1:100 fertilizer injector (Dosatron), so buckets can be filled from a spigot at the correct concentration, pre-mixed.

Water temperature and time of day can be important for selected species. Dahlias, for instance, are cut into OVB that is hot, to force conditioning. For most all other species, unheated 60-65 degree water is used. Achilleas and echinaceas are cut last thing in the evening, rudbeckias first thing in the morning in hydrating solution.

Pokon and Chrysal products can be shipped to the grower, or bought from a local floral wholesaler. The hydrator, OVB, runs about \$60 per gallon. The gallon jugs of concentrate are convenient to carry into the field. Dilution rate for OVB concentrate is 1 capful per 4 gallons of water. Be careful to monitor workers if they are mixing solutions, since it is easy to get sloppy or take shortcuts when measuring. Flowers will be damaged if too high a concentration is used, or solution will not be effective if not strong enough. The harvest buckets are filled to a depth of about 4" with OVB, 5" on a warm, windy day.

All flowers except zinnias can be held in OVB until processing, when the stem ends are cut again, and the flowers placed into a holding solution. Flowers (but not zinnias) that easily wilt can actually be held in OVB throughout a farmers market, especially in hot weather—assuming the market is the day after harvest. OVB has no bactericide, so flowers should not be held in it long enough for bacteria to grow.

A note about zinnias: at the Arnoskys', zinnias are cut into OVB in the field, and when they come into the shed they immediately go into Chrysal Professional #2. When they are packed for market the following day, the old solution is discarded and the flowers are put into a fresh solution of #2. Zinnia stems rot quickly, and they urge their customers to groom their purchased flowers; zinnias need to be re-cut and their water changed every day.

Basil for bouquets must be cut late in the day (sundown).

Sunflower harvest technique: Since the Arnoskys harvest so many sunflowers throughout the summer, they have developed streamlined techniques for cutting and bunching in the field. The cutter cuts the sunflower stem with about 36" of stem (twice as tall as a 5 gallon bucket), strips the leaves, and arranges the flowers face out in the bunch. Then, with one last cut across all the stems at the proper length, the bunch is handed off to another person wearing a nail apron full of rubber bands and little plastic bread tags with their bar code printed on them. This person wraps a rubber band twice around the stems, slides it up the bunch, and then puts another rubber band on, 3 times around, near the bottom of the stems. Bunches are placed 15 bunches to the 5 gallon bucket containing OVB. When these buckets make it back to the shed, they are taken out of the OVB and placed into clean water—research has shown that sunflowers do not benefit from additional flower food.

- **Delivery and Refrigeration**

The Arnoskys have a 12' x 12' cooler. However, most flowers are cut, processed, then delivered the next day without ever seeing the cooler. Statice is cut on the weekends and held in the cooler, and rudbeckia and yarrow are chilled down at night, but many flowers leaving the farm have not been chilled prior to delivery. They emphasize that flowers to be stored in refrigeration should not be stored in OVB more than 24 hours, since it contains no bactericide. A holding solution should be used in this case, and changing the picking solution for fresh holding solution helps to clean the stems—the picking water can get pretty dirty. Almost all flowers are processed and packed in the shed for delivery—sunflowers are the only exception to this.

The farm has three delivery trucks: a 10' x 14' Chevy box truck that goes to Houston (3 hours); a Ford box truck with shelving that goes to San Antonio (1 hour); and a 15-passenger van that goes to Austin (1 hour) to the local florists, Whole Foods, and the local Central Market stores. They are harvesting in the field on Monday and Thursday, shipping on Tuesday and Friday. None of the trucks are refrigerated, making it even more important to keep the flowers in OVB to keep them from wilting (the stores will transfer the flowers to floral food solution upon arrival). The trucks leave very early in the morning to take advantage of cooler temperatures. For some deliveries, buckets of bouquets are boxed and chilled overnight, since they are headed for a refrigerated warehouse where they will be shipped out to stores.

Pam and Frank explained how they have installed shelving in the interior of the box vans for bouquet deliveries. Along the wood runners inside the box, 2x4 boards were attached using screws, at an appropriate height for their upper and lower layers of bouquets. Plywood ¾" thick was cut into 2-foot wide pieces, and these plywood shelves sit on top of the 2x4s. These can be stacked on top of one another until needed, at the front end of the box. When loading, they first fill up underneath the stacked shelves, then pull the shelves forward, fill up the shelf, then underneath the shelves, and so on. They use bungee cords from side to side to stabilize the buckets. Since the shelves do not go all the way to the back of the truck, the back end can be used for taller items like sunflowers and lilies.

● **Bouquet-Making**

All flowers are brought into the packing shed's shade from the field. For bouquet making, flowers are laid out in groups along a table, with a *guillotine* (bunch) cutter near the end of the assembly line. They like to limit the number of different items in a bouquet to about 7 (Pam says that more than 7 will slow you down). The flower stems should have been stripped before they arrive at the bouquet assembly table. Whole buckets of each item are laid on the table, where they are picked up by the bouquet-makers as they move along the table toward the bunch-cutter. In general, Pam says that they will start with a focal flower like a lily, then add 3 stems of something spiky, 3 stems of something else, 3 stems of something else, and so on, until they have a bouquet with about 23 stems in it. Arriving at the bunch-cutter, the stems are cut off even with the shortest stem (all stems thus get a final cut), and bunch banded with a double wrap of a #32 rubber band—not too tight, as it will choke the flowers! If one is working alone, bunches can be stacked for a while, then sleeved. If working with others, the bouquets can be handed off to a person who sleeves bunches and puts them in buckets, 5 bunches to the bucket. The sleeves should be up and out of the water, or they can wick up moisture, causing the stems to mold. They

were able to have their sleeve supplier make them sleeves with holes in them to cut down on any molding in the sleeves. (Their sleeve and bucket supplier is A-Roo, listed in the Resources section of the Cut Flower Enterprise Manual).

Pam says that, working this way, two people can produce 75-100 bouquets per hour. She emphasizes that she and Frank make sure that they are the last quality control inspectors on the line. She also adds that you must watch out for uneven stems in the bunches, because only one stem out of water can ruin the bunch. Make sure the stem ends are even—you cannot control what will happen at the stores where the bouquets are sold—they'll mess up and let the water level get too low.

Typically on their farm, the flower stems are cut uniformly in the field to a length measuring from the middle of one's inner elbow to the tip of the middle finger, plus 4 inches. To get stems this tall, the plants must be cut hard, and this makes succession planting a necessity. Even though the flowers are field-grown, the long stem length gives the bouquets a more cultured look—a wildflower look with elegance.

Wholesale price on the 23-stem bunches described above is \$7.50 per bunch, and these retail typically for \$14.99 (though one store sells them for \$12.99). Retail outlets usually want to make a 100 percent markup. The price on these bouquets at the farmers' markets is \$12.50. A smaller bouquet, easy to produce, is made from Oklahoma zinnias and cinnamon basil, and these wholesale for \$3.65 and retail for \$6.99-\$7.99 (\$6 at farmers' markets). Offering different price points to the consumer is a plus.

Straight bunches (bunches of only one item) are packed 5 or 10 stems to the bunch, depending on the item. A straight bunch of zinnia stems will wholesale for \$3.65, and retail for \$7.50. Straight bunches of their Superior Sunset sunflowers wholesale as 5-stem straight bunches for \$5.00.

● **Delivery Schedules, Bar Codes, and Labels**

The Arnosky packing shed has a delivery board which lists all orders for the week and flowers available for delivery that week, so that the trucks can be loaded with the appropriate items by looking at the board and seeing who has ordered what. In some accounts, such as with Whole Foods, there is some flexibility, in that the Arnoskys and the stores have agreed that about 60 percent of the order will be bouquets, and the remainder in straight bunches. Pam e-mails the stores on Mondays as to availability—if the stores were to try and order two weeks in advance, they would miss many items that had just started to come into bloom.

One of the biggest requirements that had to be met when they started working with grocery stores was carrying product liability insurance—they currently have \$3 million in product liability coverage. In the early '90s, they joined the Universal Code Council. By paying a fee to join, your company is given a 13-digit code, of which the first 6 numbers are your company code. Sometimes grocery stores will have extra Universal Bar Codes numbers available for a vendor to use. Each product, i.e., straight zinnia bunches, bouquet bunches, lily bunches, etc., has

a separate bar code (the company code number remains constant), printed on a sticker. These are applied to the sleeves by hand with a sticker-gun.

Frank says they are “shameless marketers.” Each bucket going out to the stores is labeled with their farm logo, and each sleeve is stickered. While promoting their own farm, though, they are careful to be inclusive and to promote local farms and local production in general, hoping to help the public see the big picture. *Authenticity* is the buzzword these days, and they want to make sure people know their story—who they are, and where they’re coming from.

Educating the floor staff in the grocery stores is very important too, so they can tell the story behind the local products as well. The trick is to fire up the floral department people in the supermarkets to be excited about their flowers. They do in-store promotions, giving away small bunches to store shoppers, and the sales people get excited about this. One promotion that has been helpful was created by the Texas Department of Agriculture, which has been interested in promoting specialty crops. The TDA printed up a small card with instructions for cut flower care on one side, “Cut Flower Care Kit,” and on the other is printed “State of Perfection-Cut Flowers from Texas.” Every time Pam sells flowers at the farmers’ market, she is sure to tell every person how to take care of the flowers by re-cutting stem ends, changing the water, using fresh flower food, etc.

Donations to organizations and events can be excellent promotion. They send out flowers to garden clubs, fund raisers, etc., in buckets with their logo on them. In fact, their floral donation to former Governor George Bush’s tailgate party netted them an invitation to the inaugural in Washington, D.C., in spite of their “yellow-dog democrat” status!

Websites are important for business promotion, and their web site is www.texascolor.com. They have a bi-weekly e-newsletter in the works for their customers as well.

● **Business Management**

The Arnoskys submitted a sample enterprise budget based on their expenses and income that is included in the cut-flower enterprise manual. Their accountant comes in every two weeks to take care of entering sales, etc. Their evolution was to go from just keeping receipts to using Quickbooks, and then they graduated to Quickbooks Pro. Payroll must still be kept by hand, since Quickbooks does not have McIntosh support for payroll. Now it is easy to look back and see just how many bunches of larkspur, etc., were sold on what date: store by store, week by week. This helps them to keep track of how many bunches they grow and sell, as well as the first and last dates picked (since that’s when they sold it). Statements are not sent out to the grocery stores, which are on a 15-day payout. Pam says to be careful, because many stores will put you on a 30-day payout, and will want to put you on a 60-day payout if you are not careful. With the retail florists, they use COD basis or one-week payout, but are careful. Never sell on consignment—with perishable items, this simply does not work. Sales tax is collected on flowers sold at the farmers’ market, and at the farm stand, with two different tax rates. This is paid quarterly to the state. They use a battery-powered cash register (these are advertised in *Growing for Market*) at the farmers’ market, which has entries for both taxable and non-taxable items. At

the end of market, they can get a print-out tape of both the non-taxable and taxable items sold that day. Payroll taxes are paid monthly.

They pay their children, too. Up to \$4,500 per year is payable to children under the age of 18, without paying Medicare or social security. Ten percent of the money earned by their kids is paid out directly to them, and the remainder deposited in the children's savings accounts, which they are able to access for buying clothes, going to camp, etc.

Their business has grown so fast. They began using Quickbooks only in the past 3 years, and the accountant has started coming just this past year, every two weeks for half a day. For the past few years, their annual gross income has been around \$550,000. In 2006, the gross was \$530,000. This has yielded them a net profit for the both of them at around \$23-40,000. Of course, many expenses are farm write-offs. In general, they said, a net profit of 20 percent of gross is considered to be a successful business.

- **The Barn**

In late September of 2006, the Arnoskys, with the help of their extended community of friends and customers, built a large barn modeled on Fischer Hall, a century-old German Agricultural Society Hall about 35 miles west of Austin. A furniture-building friend designed the building, which has arched trusses. Their barn-raising on September 23 included over 200 people, who showed up to work and be fed for two days. Austin musicians came to entertain the crowd, and the barn was finished the following weekend. This barn, which has cost about \$75,000 so far, will be used for garden club tours, parties, possibly even weddings, and is the main attraction at their new farm down the road from their home. Eventually they hope to have more on-farm sales, with the market stand and new barn providing a focus for good food and good community in their little corner of paradise in Blanco County.