

Specialty Crop Profile: Ornamental Gourds

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Introduction

Ornamental gourds are an important addition to the fall sales mix, along with pumpkins, Indian corn, and fall mums (Figure 1). They fit both direct market and commercial bulk sales outlets. Like pumpkins, gourds are usually packed by bulk box or bin for shipping. In direct markets, they usually are sold by the piece, sometimes by weight. Compared to pumpkins, gourd market windows are longer with the advantage of being sold through the Thanksgiving holiday season. Gourds also can be sold throughout the year as a decorative craft items, such as birdhouses and carved or decorated gourds (Figure 2). Gourd crafting represents a significant value-added opportunity for the creative marketer and is not bound by traditional marketing seasons for produce.

Success with gourds as a specialty vegetable crop depends on attention to field management details to ensure quality yields. As an ornamental crop, product appearance and market longevity are affected by post-

harvest handling, in particular proper curing. This publication addresses these and other key considerations for ornamental gourd production.

Gourd Types

Ornamental gourds can be divided into two major botanical groups. They all belong to the Cucurbitaceae (Cucurbit) family, which includes many types of squash and pumpkins. The bright, multi-colored, thick-shelled, sometimes warty types are of the *Cucurbita* genus (*C. pepo*). *Cucurbita* gourds include such colorful types as the 'Shenot Crown of Thorns,' smooth and warted pear, egg types, and winged gourds (Figure 3). As a group, *Cucurbita* gourds have hard angular stems, but a few winter squash types used as ornamentals have soft corky stems, such as the 'Turks Turban' variety, and belong to the *Cucurbita maxima* species (Figure 4). In general, the types with hard stems tend to keep longer. The *Cucurbita* have prickly leaves and stems, and yellow flowers.



Figure 1. Gourds used in a fall display (photo by A. Bratsch)



Figure 2. Gourd crafting (photo courtesy University of Florida Extension, <http://sarasota.extension.ufl.edu/FHLC/ImgFiles/Gourds.htm>)



Figure 3. "Winged" *Cucurbita* gourds.
(Photo by A. Bratsch)



Figure 4. Turks Turban (*C. maxima*) squash with soft stem.
(Photo by A. Bratsch)

The second group includes the hard, thin-shelled "utility" bottle/birdhouse gourds belonging to the *Lagenaria* genus. The *Lagenarias* have smooth stems; soft, large leaves; and white flowers. The *Lagenaria* gourds are tan to brown when mature with long, narrow hard stems and have many distinct shapes and sizes. This includes such unique types as the caveman's and Hercules' club, calabash, dolphin (maranka), swan gourd, Corsican flat, apple, drum, bottle, and small and large dipper types (Figure 5).



Figure 5. Various types of *Lagenaria* gourds.
(Photo by A. Bratsch)

Gourd seed can be purchased from various seed companies. Table 1 lists several companies that have a good variety selection and are known to regularly evaluate cucurbits. Days to maturity will vary by species and variety, ranging from 90 days from seed for the small *Cucurbita* gourds to over 120 days for *Lagenaria* types. As the weather cools in the fall, additional time in the field may be needed.

Table 1. Seed Sources: companies with active cucurbit evaluation programs.

Name	Location	Contact Information
Rupp Seeds Inc.	Wauseon, Ohio	(800) 700-1199; http://www.ruppseeds.com/
Seedway Inc.	Elizabethtown, Pa.	(800) 952-7333; http://www.seedway.com/
Johnny's Seeds	Winslow, Maine	(800) 854-2580; http://www.johnnyseeds.com/default.aspx
Harris Seeds	Rochester, N.Y.	(800) 544-7938; http://www.harrisseed.com/
Twilley Seed Co.	Hodges, S.C.	FAX: (864) 227-5108; http://www.twilleyseed.com/

Tips for Field Production

The Cucurbitaceae family is tropical and sub-tropical in origin, and does not tolerate cold soils or cool growing temperatures. Even a light frost will significantly damage foliage and impede crop development. Planting should be delayed until the late spring when soils have warmed. When making planting date decisions, average fall frost date and marketing period should be considered along with varietal days to maturity. Proper timing of the planting to allow the crop to mature before frost is of particular importance. These factors should also be considered when making decisions to direct seed or transplant the crop in the field.

Both species have sprawling growth habits and require room to spread. *Lagenaria* types readily climb by long twining tendrils, and are often grown supported by a trellis. All cucurbits are monoecious (separate male and female flowers on the same plant), and require insects (bees) to transfer pollen and to set fruit. Night-flying moths are also known to pollinate *Lagenaria*.

Cucurbita Notes

Cucurbita gourds can be grown in most areas of the state. If planted and harvested too early, they may lose their color or rot before fall sales commence. They can be direct seeded along with pumpkins and winter squash into tilled or no-till fields, or into plastic-mulched beds. No-till planting is especially practical on hilly or sloped sites, providing a natural mulch cover that slows erosion, keeps the gourds cleaner, and helps to prevent weed problems (Figure 6). Information about the no-till system can be found in the *2005 Commercial Vegetable Production Guide*, Virginia Cooperative Extension publication 456-420, <http://www.ext.vt.edu/pubs/vegetables/456-420/456-420.html>.



Figure 6. New gourd plants growing in a no-till system using a killed and rolled cover crop of cereal rye.
(Photo by A. Bratsch)

For direct seeding, approximately two to three pounds of seed per acre is required. Rows should be spaced six to eight feet apart, and plants two and one-half to three feet apart in the row. Seeds can be sown by hand or dropped with a mechanical seeder. Usually more than one seed (two to four) is dropped per planting hole (hill system) to assure a good stand. Depending on site productivity and row spacing used, hills can be thinned later to one to three healthy seedlings.

Lagenaria Notes

Lagenarias have a long growing season and need early planting to mature by the end of the season. Otherwise a large percentage of fruit will be green at first frost. In comparison to Cucurbita types, Lagenarias are more sensitive to cold, and more adapted to consistent warm weather conditions. Soils should be at least 65°F prior to planting. To speed growth and development, use transplants instead of direct seeding and plasticulture (black or clear plastic film over soil) in short-season regions of the state.

Lagenarias are vigorous growers and develop large plants. Vines may reach 20 to 30 feet in length. Rows should be 10 to 15 feet apart, with plants set five to six feet apart in the row. Because of the price of seed and their vigor, multi-plant hills are not recommended. The above spacing will require 500 to 700 plants or seeds per acre. For the bottle and dipper types, trellising will allow fruit to hang, resulting in a straight neck. If allowed to grow on the ground, the fruit will curve in various directions.

Fertilization and Irrigation

The ideal soil pH is in the range of 6.5 to 7.0. A soil test should be conducted to determine available phosphorous (P), potassium (K), and magnesium (Mg) levels. Low P and K soils require amendment to increase levels of these nutrients to moderate levels per soil test standards. As a starter fertilizer, at least 50 pounds of P and 100 pounds of K per acre should be applied in most soils. Gourds are sensitive to low levels of Mg, and soils should test to 100 to 125 pounds per acre of this nutrient. If not, Mg should also be supplemented preplant. Because of significant vine and leaf growth, gourds respond to fertile soils and applied nitrogen (N). At planting apply 50 to 60 pounds of N per acre along with P, K, and Mg amendments. Vines will begin to run or spread in three to five weeks after planting. An additional side dressing of 30 to 40 pounds of N per acre should be applied to keep plants vigorous. With drip irrigation, supplemental N can be injected and split-applied at two- to three-week intervals. By late summer, nutrients and water should be reduced. This will permit plants to slow growth and recently set fruits to mature and harden off.

Supplemental irrigation on both tilled and no-till fields can be beneficial during dry periods and increases yields. Irrigation should supplement rainfall with an average of one to two inches per week. Water should be withheld during the end of the season to hasten maturity.

Pollination

Wild or native bees and other insects may suffice to pollinate small plantings. Growers should be careful to observe this activity. If an acre or more is planted, honeybee hives should be brought into the field (Figure 7). At least one strong hive for every one to two acres is suggested. Bees should be introduced soon after the first male flowers appear. The colonies should remain in place for a period of six to eight weeks.



Figure 7. Honeybees introduced to cucurbit field to improve pollination (Photo by A. Bratsch)

Care should be taken not to spray pesticides toxic to bees during the day when bees are active. Late evening is the best time for pesticide application, especially during the pollination period.

Be aware that some night flying moths may help to pollinate *Lagenaria* species and could be present during the evening hours.

A Note on *Lagenaria* Pruning

For small-scale plantings, *Lagenaria* gourds will respond to vine pruning by increasing the number lateral shoots (runners) and of female flowers that develop into fruit. Vines should be tipped back once with a mower or by hand when they reach eight to ten feet in length. *Cucurbita* gourds are not vine pruned.

Pest Control

Like pumpkins and squash, a number of common diseases and insects affect gourds. Important foliar and fruit fungal diseases include anthracnose, downy mildew, powdery mildew, *Plectosporium* blight, *Alternaria*, and soil-borne *Phytophthora* and *Fusarium* root and fruit rots. Various fruit rots can be a problem under wet environmental conditions or where good crop rotation is not practiced. Bacterial leaf spot and bacterial wilt may also be problematic, depending on the cultivar resistance and site conditions. Viruses can also affect cucurbits with variety resistance and aphid management the primary tools for control.

Specific information for several diseases can be found in selected Virginia Cooperative Extension publications:

Plectosporium Blight of Cucurbits, Virginia Cooperative Extension publication, 450-709, <http://www.ext.vt.edu/pubs/plantdiseases/450-709/450-709.html>

Downy Mildew of Cucurbits, Virginia Cooperative Extension publication, 450-707, <http://www.ext.vt.edu/pubs/plantdiseases/450-707/450-707.html>

Powdery Mildew of Cucurbits, Virginia Cooperative Extension publication, 450-710, <http://www.ext.vt.edu/pubs/plantdiseases/450-710/450-710.html>

The most common insect problems are striped and spotted cucumber beetles, squash bug, squash vine borer, and aphids.

Control of squash bugs is particularly important and further information can be found in *Squash Bug*, Virginia Cooperative Extension publication, 444-031, <http://www.ext.vt.edu/pubs/entomology/444-031/444-031.html>

In general, *Lagenaria* gourds are more resistant to disease and insect problems than are the *Cucurbita* species.

Few chemical control products specify gourd species on their label, and instead may lump cucurbits under a general heading. Materials that control diseases and insects on pumpkins, cucumbers, and melons will also control the same pests on gourds. It is important to choose resistant varieties if available, and implement cultural practices that ensure plant health as a means to decrease insect and disease problems. The Virginia 2005 *Commercial Vegetable Production Guide*, Virginia Cooperative Extension publication 456-420, covers varietal considerations and pest management in detail. It is available on-line at <http://www.ext.vt.edu/pubs/vegetables/456-420/456-420.html> or in print through your local Extension office. Your Extension agent is also available to assist in production and pest management decisions.

Harvest and Handling

Harvest

Average yields for the small *Cucurbita* gourds will be from 20,000 to 30,000 fruit per acre. For the *Lagenarias*, expect a range of 2,000 to 5,000 gourds per acre. Significant man-hours (approximately 200 to 300 hours per acre) will be required for harvesting and processing.

To assure quality, timely harvest and proper handling and curing are necessary. *Cucurbita* gourds are frost sensitive when mature, and should be harvested before the first predicted frost event in the fall. Full-color development, and the drying and hardening of the stem and outer skin are harvest indicators. Immature gourds will

not cure well, and are best left in the field. Harvested fruit with spots of decay or damage or that are too immature should be sorted and discarded. Depending on planting date, a range of fruit maturity is typical, as plants will continually set new fruit over the season. Where days to maturity are observed, a large percentage of fruit should be mature on the vine before frost; a few may have passed ideal harvest stages.

At maturity, Lagenaria gourds will begin to change from bright green to pale green and eventually to tan. The stem will also become more rigid and dry. In contrast to the Cucurbita types, once fruit has reached a mature- or firm-green stage, with proper curing they will usually dry without decay or shrinkage. Some of the Lagenaria types, such as the speckled swan gourds (Figure 8), are harvested green and are marketed in a timely manner similar to Cucurbitas. If the season allows, it is best to leave them in the field until they are as near to maturity as possible. Frost may affect the final tan color, surface pattern, and seed viability, but not the shell integrity of a mature Lagenaria.



Figure 8. Speckled swan gourds harvested at the mature-green stage. (Photo by A. Bratsch)

Handling

Harvest all gourds with one to two inches of stem intact. An intact stem enhances value. Care should be taken not to bruise or scrape them, and always clip, not tear the fruit from the vine. Freshly harvested gourds can be washed in warm, soapy water, using a soft brush to clean warty types. A light pressure rinse may suffice, followed by a dip in clean water with a household disinfectant, rubbing alcohol, or a light bleach solution (1 percent to 2 percent). This step is important to reduce fungi and bacteria on the surface that can find entry through surface injuries.

Both types are cured under similar conditions; however, the Lagenaria group requires several months to cure before it can be marketed while the Cucurbita group needs only a few weeks to properly cure for market. When cured properly, Lagenarias will last for many years; the Cucurbita types six to nine months before the colors begin to fade.

Curing is a two-step process, involving a short period for surface drying, and a second, longer internal curing period. Surface drying hardens the outer skin and sets the colors for the Cucurbita types. Spread out cleaned gourds on a screen or newspapers in a well-ventilated, partially sunny area, and turn them regularly. Discard any that shrivel or develop soft spots. Surface drying can take from a few days to a week.

Gourds can also be cut from plants and initially left to dry in the field. This is often done with Lagenaria types. Uncleaned, field-dried gourds should be rinsed and wiped down with a disinfectant solution before continuing with internal curing. Harvest bins, packing boxes and shipping crates are not advisable places for curing, as lack of air movement will result in rotted gourds.

Internal curing requires a warm (80°F), low-light, and dry location. Warmth encourages rapid drying, darkness prevents color fading, and dry conditions discourage mold. Artificial heat can be used, but without ventilation it can lead to faster mold development. A well-placed fan can help speed the process. Cucurbita gourds will need an additional two to four weeks to final cure, while Lagenaria species may take up to three months to fully cure; longer if they were green at harvest. Seeds rattling inside indicate the gourd is fully dry. Prior to shipping or display in the market, sort cured Cucurbita gourds one last time for decay, as potentially immature fruit may have been harvested in the rush to beat frost or get them to market.

During curing of Lagenaria, it is common to see mold growing across the surface. The mold can leave desirable, unique patterns as it breaks down the waxes and upper skin layers, yet the fruit wall integrity is not diminished (Figure 9). Lagenaria gourds are highly resistant to decay and to an extent can be exposed to the elements and variable temperatures. Long-term winter exposure can result in cracking and weaken gourds and is not advised. At a minimum, these gourds should be stored in a barn or well-ventilated shed. Regular wiping with alcohol or a light bleach solution can discourage mold growth if a solid tan color is desired for these types.



Figure 9. Lagenaria gourd with mold growth and patterns on surface.
(Photo by A. Bratsch)

Following curing, gourds can be waxed, lacquered, or painted to extend their life and improve appearance. For colored cucurbita types, well-cured gourds may last three to four months without this treatment while coating with wax or varnish will extend storage life and color retention to six to eight months. Paste wax will provide a soft luster to the gourd, while varnish or lacquer adds a hard, glossy shine. Dip waxes used for fruit such as apples and oranges can also be used on gourds to extend life, and some commercial buyers require this treatment.

Gourds can be sanded smooth and painted as well, which can greatly extend the life of the Lagenaria types used outdoors, such as for a birdhouse. Often they are painted gold or silver for table displays.

Lagenaria types have many utilitarian uses. The crook-necked types can be cut into dippers and scoops; the larger drum gourds used as storage vessels. For birdhouses, drill a small hole through the top for a hanging cord. On the side, cut a hole large enough to accommodate wrens, barn swallows, or other small birds. Shake out the dried seeds. A small hole drilled in the bottom will help drain any rainwater that finds its way into the house. These natural-gourd birdhouses can last for many years.

Notes on Saving Seed

Seeds from both types can be saved successfully, and market potential exists to sell seed to local gardeners and other growers. An understanding of crossing relationships is important when saving seed. Some varieties of gourds are hybrids that will not be true to seed the next year. In addition, other Cucurbita such as summer squash, and some pumpkins and winter squash will inter-cross freely with gourd types. However Lagenaria and Cucurbita species will not cross. Random crosses

between varieties within either species will result in progeny not true to the parent. However, interesting, and unique gourd forms and colors may result from these chance crosses.

To ensure that seed is true, isolation or blocking of the planting by variety should be practiced to limit cross-pollination potential. One of the best methods to ensure true seed is to directly hand-pollinate selected flowers as they open, with a known pollen source. Use a ribbon, flag, or other marker to keep track of these fruit through the harvest period. Fruits should be fully mature before seeds are extracted. Separate seeds from the pulp and spread in a thin layer on cloth or newspaper until dry. Store seed in a cool, dry place. Under ideal conditions seed may remain viable for three to five years.

Gourds of all types can be profitable additions to the fall market mix. An understanding of proper production practices and handling will ensure greater success and customer satisfaction.

Additional References

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