



Ginger and Turmeric

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Introduction

Ginger (*Zingiber officinale* Roscoe) and turmeric (*Curcuma longa*) both have a long history of use in Asian, African and Caribbean cuisines. Fresh ginger is available year-round in the U.S. and Canada from produce wholesalers sourcing from global suppliers, and both are widely available in their dried, ground form that is produced from their underground rhizomes.

The U.S. ginger crop is mainly grown in Hawaii. Recently, some U.S. vegetable and greenhouse growers have added ginger and turmeric as high-value specialty crops to meet consumer demands for locally grown ingredients. Producers in the northeast have successfully produced ginger in high tunnels, and experience with ginger and turmeric production (through the 2018 season) indicates both crops may be adaptable to high tunnel production in Kentucky.

Marketing

Kentucky producers have focused on selling directly to consumers, using local market channels like farmers markets and community supported agriculture. A few producers also sell these specialty crops via wholesale marketing for restaurant chefs. Some food retailers focused on offering organic and local produce have reported sourcing ginger locally.

Local farmers market customers and CSA members will benefit from recipes and preparation suggestions for fresh ginger. Shelf life and storage considerations should be conveyed to customers, as the fresh “baby” ginger in its immature stage produced in high tunnels will have different requirements than the mature ginger that is available



BABY GINGER

at grocery stores. Turmeric producers should also provide use guidelines, as fresh turmeric is not commonly found in the marketplace. Common uses include using the vegetative tops of both plants to make teas, and both crops are used in juicing. Both rhizomes can also be dehydrated, pickled or candied.

Ginger and turmeric have received attention in the health and wellness product market, with turmeric attracting much recent interest. The FDA regulates how products may be marketed with respect to claims of potential health benefits. Farm marketers must understand the potential ramifications of making health claims when selling fresh produce crops, as associating these specific crops with health benefits violates food marketing regulations.

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Market Outlook

In U.S. home and foodservice kitchens, ginger has moved from a spice featured in baking and seasonal foods to a more mainstream, year-round ingredient. Consumer interest in using fresh spices and preparations, like pastes, has increased as ethnic cuisines become more mainstream. The U.S. is regularly ranked among the world's top importers of ginger because of U.S. consumer demand and lack of suitable climate for large-scale ginger cultivation. China was the largest supplier of imported ginger to the U.S. through 2018. India is also one of the world's largest ginger producers. Fresh ginger imports have increased substantially from Mexico, the Dominican Republic, Peru and Brazil. Nigeria and Thailand also send significant volumes of ginger to the U.S.



TURMERIC

For the fresh market, ginger and turmeric are examples of niche crops where local markets could become easily saturated by overproduction. Producers are advised to avoid producing substantial quantities without first having an understanding of local market demand. Larger volume sales of ginger will be challenged by its wide availability as a wholesale produce commodity. The wide availability of turmeric spices and supplements will also challenge local marketing.

Production Considerations

Cultivar selection

Selecting high-quality, disease-free seedstock is important for growing ginger and turmeric. Growers in the continental U.S. usually purchase rhizomes from Hawaii. One popular ginger selection is 'Bubba Blue.' Quality seed pieces weigh 1 to 2 ounces and are shiny and clean with obvious rhizomes. Seed pieces can usually be purchased pre-cut for a nominal fee, or as whole "hands" (larger, intact rhizomes) that the producer will need to divide into smaller seed sections.

Follow recommended seedstock handling and sanitation procedures. Turmeric cultivars, which take longer

to mature than ginger, are less widely available; sourcing and seed handling procedures are similar to ginger.

Pre-sprouting

Ginger is planted in stages, with seed pieces prepared for pre-sprouting before planting into the high tunnel bed or containers.

Ginger seed pieces of about 1 to 2 ounces are the "fingers" snapped off of larger "hands," the name given to ginger rhizomes resembling a human hand shape. Ginger in Kentucky should be pre-sprouted in a greenhouse environment in February or early March. Place the seed pieces flat on top of

planting media or coconut fiber, maintaining a temperature of 70 F to 85 F. Those are covered at a depth of 1 to 2 inches.

Warmer temperatures, nearer 85 F, result in faster germination. More rapid germination tends to occur with bottom heat, and trials in New Hampshire found that sprouting with heat mats resulted in substantially higher yields of baby ginger. Steady moisture should be maintained while avoiding overwatering. Maintain the sprouting ginger for four to eight weeks, until the tops have emerged at least 1 to 2 inches above the growth media.



GINGER TRANSPLANT

Planting in the High Tunnel

The pre-sprout phase is critical to get a head start for planting because of the long growing season required for ginger and turmeric production. Planting into a high tunnel requires soil temperatures above 40 F, but



APPLYING COMPOST BEFORE PLANTING

ideally closer to 55 F. Generally, Kentucky high tunnel producers can safely transplant ginger and turmeric into their tunnels by mid-April or early May.

Ginger and turmeric are heavy feeders with substantial nitrogen needs to produce large rhizomes. Apply compost at rates equivalent to 15-20 tons per acre before planting. Additional nitrogen applications at a rate of 150 pounds per acre are needed, with a 100-pound per acre equivalent added at planting and two applications of a 25-pound per acre rate later in the season, at hilling.

Rows should be a minimum of 42 inches apart to allow ample space for hilling ginger. Turmeric does not require hilling and may be planted closer. Compost and the first fertilizer application may be applied to an 8-inch deep trench, incorporating to a depth of 12 inches. Seed pieces may be planted five to six inches apart in the row; plant seed pieces to allow for a full foot of soil above seed. About 30 pounds of ginger pieces will be needed to plant a 100-foot row.

Maintenance and Hilling

Both ginger and turmeric require moist soil, supplied by two lines of drip irrigation per row in the high tunnel. Ginger can be planted with a single drip line, with a second line added at the first hilling event. Since hilling is not required for turmeric, both lines of drip can be installed at planting, or the second added in midsummer.

Ginger will need to be hilled two or three times during the growing season. The first hilling is needed when the base of the stem turns from white to bright pink.

This color change may occur below the soil surface, so soil may need to be removed to observe the stem color change. The second hilling will occur four to six weeks later, with a final hilling possible two weeks after the second hilling. Care should be taken to avoid damaging the rhizomes when hilling. Hand weeding is advised to avoid damaging the ginger and turmeric rhizomes.

Ginger and turmeric require nutrients to be applied near the plant, as they are not efficient nutrient scavengers. The second two nitrogen applications should be applied near the base of the plant. Commercial ginger growers in the Pacific region increase the ratio of potassium fertilizer in later fertilizations to attempt to improve glossiness of the roots.

Pest management

Soil-borne and seed-borne diseases can devastate ginger and turmeric production. The crops are susceptible to bacterial wilt (*Rolstonia solanacearum*), bacterial soft rot (*Erwinia sp.*) and *Pythium*. Fusarium rot (*Fusarium spp.*) can affect the roots postharvest. Avoid planting ginger alongside or in rotation with solanaceous crops (tomatoes, peppers, eggplant). Many soil-borne diseases can be avoided by purchasing tissue-cultured, disease-free seed stock. If there is concern



HILLING GINGER

about soil-borne diseases, seed pieces can be grown in plastic bags or buried in the ground inside a large nursery pot, 3-gallon size or larger.

Nematodes are a potential pest of ginger and turmeric. Avoid planting in high tunnels with a history of nematode infestations, and avoid using cover crops that may host nematodes.

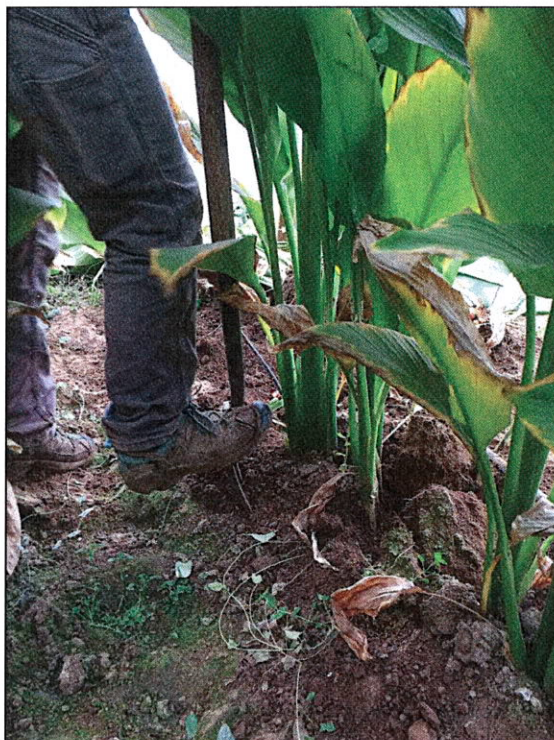
Harvest

Ginger and turmeric can be harvested at varying maturities. Baby ginger and baby turmeric lack the tough outer skin of mature rhizomes, and baby ginger has colorful (pink or cream) rhizomes that are not as tough to cut through as mature ginger. Interior color of the flesh may vary by variety; the “Bubba Blue” variety will take on a blue hue as it ages.

Kentucky growers will be able to harvest baby ginger six to 10 months from planting. Baby turmeric harvest will begin eight to nine months after planting. Mature growth stage for ginger takes closer to eleven or twelve months, and may only be possible if supplemental heat is provided in the tunnels. Plant leaves will brown with cold temperatures and frost. Plants can remain in the ground as long as there is an inch of green above the rhizome. Plants should be pulled from the ground once greenery dies back completely.

Ginger and turmeric are harvested by hand with a digging fork. Young ginger and turmeric have delicate skins, so the crop should be harvested with care. The tops are trimmed with a knife and the roots are washed to remove dirt.

Expansion ratio of ginger can vary based on growing conditions, but has been reported as high as 10-12 lbs. harvested for every 1 lb. planted. A moderate estimate of yield would be 5-6 lbs. harvested for every 1 lb. planted. Given sufficient time, fertility and irrigation, the yield potential for these tropical crops grown in high tunnels is quite good.



HARVESTING TURMERIC

Postharvest Handling

Young ginger, or baby ginger, can start to be harvested five or six months after sprouting. Young ginger, which can command a price premium, is often pickled. Avoid exposing young ginger to sunlight to prevent dehydration.

Commercial ginger producers in the Pacific may trim plant foliage two to three weeks before harvesting young ginger to encourage development of a protective layer between the rhizome and pseudostem. This may not be needed in a high tunnel crop as careful handling of baby ginger and immediate marketing will reduce potential injury effects.

Mature fresh ginger and turmeric can be stored for about two weeks in a cooler at 55 F or above. Growers may want to advise consumers on alternative ways to preserve these highly perishable crops. For example, customers may be advised to freeze their mature ginger, grating only the amount needed and then refreezing the rest of the root.

Labor requirements

Planting and production labor will vary according to specific high tunnel layout, equipment use, and weeding time. Production labor requirements will be great-



BABY GINGER AT HARVEST

er for ginger than for turmeric, because of additional time needed for hilling. Time and expense of the additional hilling needed to produce a mature ginger crop should be accounted for when determining the crop price.

Economic Considerations

The largest expense is the cost of establishing and maintaining the high tunnel. Growers with existing high tunnels, especially those used for non-solanaceous crops, may be able to add ginger or turmeric production to diversify crop offerings. Seed costs ranged from \$8 to \$10 per pound, or about \$300 per 100-foot row. Other production costs include irrigation equipment and drip irrigation lines, weeding and hilling labor, and harvest labor.

A 100-foot row yielding 200 pounds of ginger would likely need to command a price of at least \$3 to \$5 per pound to cover high tunnel production costs in Kentucky, including labor. Growers will need to account for the relatively high cost of production, per pound, when pricing and marketing ginger and turmeric.

Selected Resources

- Effects of early season heating, low tunnels, and harvest time on ginger yields in NH, 2017. (UNH Cooperative Extension, 2018) https://extension.unh.edu/resources/files/Resource007161_Rep10344.pdf
- Establishment of Turmeric (*Cucurma longa*) as a High Value Medicinal Crop to Sustain Small Farms in Alabama. (Alabama A&M University, 2018) Project summary at: <https://portal.nifa.usda.gov/web/crisprojectpages/1008952-establishment-of-turmeric-curcuma-longa-as-a-high-value-medicinal-crop-to-sustain-small-farms-in-alabama.html>
- Ginger – *Zingiber officinale* Roscoe (University of Florida, 2015) <http://edis.ifas.ufl.edu/pdf/MV/MV06700.pdf>

- Ginger Turmeric 2018 (field day presentations) (Virginia State University, 2018) <http://www.vsuag.net/ginger-turmeric-2018/>
- Growing High Tunnel Ginger in High Tunnels: A Niche Crop with Market Potential. (Virginia State University, 2012) Proc. Fla. State Hort. Soc. 125:142–143. 2012. http://fshs.org/proceedings-o/2012-vol-125/FSHS_vol_125/142-143.pdf
- Turmeric (University of Florida, 2016) <http://gardeningsolutions.ifas.ufl.edu/plants/edibles/vegetables/turmeric.html>
- Valenzuela, H. 2011 (revised). Farm and Forestry Production and Marketing Profile for Ginger (*Zingiber officinale*). In: Elevitch, C.R. (ed.). Specialty Crops for Pacific Island Agroforestry. Permanent Agriculture Resources (PAR), Holualoa, Hawai'i. <http://pacificschoolserver.org/content/public/Local%20Topics/Pacific%20Islands/Agriculture%20for%20Islands/Specialty%20crops/Ginger.pdf>
- Kratky, B. and C.I. Bernabe. 2009. Outdoor growing of clean edible ginger seed by a pot-in-pot-in-pot sub-irrigation method. Proc. of the 35th National Agricultural Plastics Congress. American Society for Plasticulture, Bellafonte, PA (published on a CD). https://www.ctahr.hawaii.edu/hawaii/downloads/Outdoor_growing_of_clean_Edible_ginger_seed_by_a_Pot-in-Pot-in-Pot_Sub-irrigation_method.pdf

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