Center for Crop Diversification
Martin-Gatton College of Agriculture, Food and Environment

Center for Crop Diversification Fact Sheet
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Vegetable Transplant Production

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Introduction

Vegetable transplants may be grown in the greenhouse as a standalone crop or grown alongside other plants. There is larger commercial demand for tomato, pepper, melon and cole crop transplants in Kentucky than there is for less common and specialty varieties, such as eggplant, okra, ethnic, or heirloom vegetable varieties.



Seedlings on workbench

Information in this fact sheet can aid growers in determining whether to produce their own vegetable transplants or obtain transplants from another source. It will also help growers evaluate transplant production as a primary enterprise.

Marketing

The quantity of vegetable transplants demanded by Kentucky growers increased with a rise in vegetable acreage during the early 2000s. Large-scale commercial operations

require significant quantities of transplants, and these may either be produced on the farm, by a local producer, or purchased from wholesale suppliers.

The number of smaller vegetable farms has also increased, and these farms require fewer transplants, but often want a wider diversity of varieties. Smaller farms may also produce their own transplants – including transplant production for sale to other growers and to home gardeners – through sales from the farm, at farmers markets and other direct market channels.

Wholesale markets for transplants include local garden centers, landscape contractors, discount stores, grocery stores, farm stores and roadside stands. Transplants are also sold at Kentucky's produce auctions, where prices for plants can range from wholesale to retail levels.

Market Outlook

The wholesale market for vegetable and bedding plant transplants is highly competitive, with low costs of production realized by large commercial greenhouses. However, because of some increase in regional demand for commercial vegetable transplant varieties, Kentucky greenhouses may see some new opportunity to produce transplants for local growers. There are also local market opportunities for mid-sized and niche greenhouses committed to excellent management and production of vegetable transplants for the local market.



Seedling trays

Niche markets, such as heirloom vegetable transplants or certified organic transplants, can provide some opportunities for smaller farms or greenhouses to develop profitable vegetable transplant production. Marketing transplants in unconventional pack sizes, such as selling potted tomato plants at a farmers market, may be an opportunity for

growers to grow direct market channels for vegetable transplants. Potted transplants may have significantly more profit potential, per plant, for the grower. Another market niche is production of transplants for fall planting either in the field or in high tunnels. Wholesale growers target spring planting and often do not have transplants available for autumn planting. Some crops, such as cole crops, may actually grow better when planted in late summer for autumn production.

Production considerations

Site selection and planting

Spring vegetable transplant production requires a heated greenhouse structure. The amount of time and investment for greenhouse site preparation, such as drainage and utilities, will vary between situations. Follow expert and university guidelines and recommendations for greenhouse location and site preparation.



Seedlings

Seeding for spring and summer transplants in Kentucky usually starts in January, lasting through late spring. Seeding fall transplants starts in mid-summer. Growers requiring transplants for succession plantings, necessary for farmers market and community supported agriculture production, will need to develop a planting schedule long before seeding begins.

Many commercial growing substrates are available. The choice of mix can depend on a number of factors including availability, grower preference, cost and plant species. Some growers may create their own custom substrate mixes. This can require a greater investment of time as well as specialized equipment.

Pest management

Greenhouse conditions that favor plant growth also favor the rapid build-up and spread of insects and diseases. Potential disease problems include damping-off, root rots, powdery mildew, fungal leaf spots, and viruses. Common insect pests include thrips, aphids, mites, fungus gnats, shore flies, and white flies. Caterpillars can also be a problem in greenhouses with open sides. Prevention, monitoring and sanitation are the keys to insect and disease management.

Weed management under benches and around the greenhouse will reduce insect pests and disease pressure. Few herbicides are registered for use in greenhouses and application times are very strict. The pesticide label is the law. If the greenhouse is allowed to freeze in the winter to help prevent pests from overwintering, growers must remember to drain all water lines in the fall to prevent damage to plumbing components.

Good sanitation and sterilization prevents the introduction of plant diseases into the greenhouse. High-quality, disease-free vegetable seeds are essential for vegetable transplant production. All greenhouse tools should also be kept clean and sanitized. Benches, walkways and other areas and equipment should be sanitized between production cycles. Sterilized substrates will prevent disease introduction through growing media. Reusable trays should be cleaned and sterilized before being used for production.

Post-production

Proper post-production care is essential to maintaining quality transplants. Plants should be planted or sold within a week after they have hardened off. Plants ready for sale should be kept cool and shaded from direct sun to extend their shelf life. Proper fertility and lighting both within the greenhouse and outside is critical to producing quality transplants.

Economic considerations

Producing vegetable transplants can add profitability to an existing greenhouse operation, and large-scale transplant production may justify new greenhouse startup costs. However, greenhouse startup costs can be significant, and successful greenhouse operation involves demanding labor and experienced management.



Seedling

Initial investments (fixed costs) include greenhouse site preparation, construction and equipment costs. The cost of a production-ready greenhouse, excluding land costs, can run from $5 per square foot for a Quonset-style poly house to more than $20 per square foot for glass panel houses. A representative cost was developed for a 30-foot x 96-foot heated high tunnel greenhouse with poly covering in Kentucky. Representative costs for site preparation, greenhouse kit, reusable equipment costs, and construction materials and labor were estimated at $13,875 (2017).

Variable costs for vegetable transplant production include seeds, growing media, replacement plug or seedling trays, hired labor, and containers for transport and/or marketing. Tray sizes commonly used in Kentucky include 50-cell, 72-cell and 128-cell. Prices per tray (2017) are not significantly different by cell count, meaning that the price per transplant will be less for those grown in trays with more cells but cell size needs to be matched to the specific type of plant being grown.

Seed, labor and utilities costs are the greatest costs of vegetable transplant production. Labor costs can exceed seed costs, depending on the crop and production system. Differences in greenhouse systems and production efficiencies make labor costs highly variable, from far less than $10 per 1,000 plants in large automated systems to as much as half the transplant cost in small greenhouses. The cost of growing media per transplant depends on cell size and substrate type, ranging from fractions of one cent to one to two cents per transplant. Fertilizer and irrigation costs will depend on the type of

fertilizer and water source, rarely exceeding one cent per transplant. Electricity and heating costs will depend on average temperatures and seeding date.

	Estimated variable cost ranges for 2017 production (per 1,000 plants) include:
Seed	$30 to $80 per 1,000 (broccoli, cabbage, pepper, round tomatoes)
	$140 to $250 per 1,000 (seedless watermelon, heirloom/specialty tomatoes)
Transplant production	$15 to $60 per 1,000 plants (variable costs not including seed costs)

Producers should develop production cost estimates specific to their situation. Production costs and returns vary greatly depending on site preparation, crops grown, greenhouse size, production system, and marketing strategy. Useful sample budgets for estimating greenhouse plant production costs are available from Rutgers University (see Selected Resources below).

Selected Resources:

On the web

- Greenhouse Business in Kentucky – A Review of Crops and How to Begin a Business (University of Kentucky, 2002) http://www.uky.edu/hort/sites/www.uky.edu.hort/files/documents/greenhousesinkentucky.pdf

- Managing the Greenhouse Environment to Control Plant Diseases, PPFS-GH-01 (University of Kentucky, 2004) http://plantpathology.ca.uky.edu/files/ppfs-gh-01.pdf

- Selected Resources and References for Commercial Greenhouse Operators (University of Kentucky, 2002) http://www.uky.edu/ccd/sites/www.uky.edu.ccd/files/GHresources.pdf

- Commercial Production of Vegetable Transplants, B-1144 (University of Georgia Cooperative Extension, 2017) http://extension.uga.edu/publications/detail.cfm?number=B1144

- Commercial Transplant Production in Florida, HS714 (University of Florida IFAS Extension, 2015) http://edis.ifas.ufl.edu/cv104

- Greenhouse Costs of Production Budgets (Rutgers, 2008) http://farmmgmt.rutgers.edu/green-house/greenhouse-index.html

- Integrated Pest Management for Greenhouse Crops (ATTRA, 1999) http://attra.ncat.org/attra-pub/gh-ipm.html

Books in print

- Ball Red Book, 2 vols. (18th edition). Chris Beytes and Jim Nau, eds. 2011. Ball Publishing.

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