Northeast Sustainable Agriculture Research and Education Program
Final Grant Report

1. Project Name and Contact Information

Title: Greenhouse Ginger Cultivation in the Northeast
Number: FNE06-564
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2. Goals

- To explore an option for use of under-utilized greenhouse space
- To successfully grow and sell *local* culinary ginger
- To increase profit and sustainability

3. Farm Profile

Old Friends Farm is Certified Naturally Grown and cultivates three acres. Our main products are cut flowers, salad greens, garlic, and shiitake mushrooms. Old Friends Farm sells at four farmer's markets per week, wholesales to restaurants and florists, and arranges for weddings and special events in the Pioneer Valley and Boston area. The farm is owned and run by two full-time partners, with one part-time employee and occasional added labor during peak production times.

4. Project Participants

This project was cooperatively executed by *Melissa Bahret* and *Casey Steinberg*, co-owners of Old Friends Farm. *Hans Leo*, project director of educational programs at Bramble Hill Farm, (Amherst, MA), offered technical assistance. *Caitlin Clarke*, our part-time employee, helped with fertilizing.

5. Project Activities

We purchased one forty-pound case of starter ginger from Biker Dude Organic Ginger Farm in Pahoa, Hawaii. These 'mother roots' were cut into smaller pieces, each containing a few nodes. The mother roots were sanitized and three pieces were planted into a bag of five gallons of soil mix. The initial soil mix consisted of two cubic feet (cu ft) fine peat moss, one cup perlite, one cu ft coarse vermiculite, 20 tablespoons gypsum, 4 tablespoons 5-4-8, and ½ gallon diatomaceous earth. One hundred planted soil bags were placed on our greenhouse tables on April 1st. The ginger was irrigated minimally during the first few months, and temperatures in the greenhouse were kept at the conditions we normally need for our starts (minimum 55 degrees, vent at 75 degrees).

Weekly fertilizing began three weeks after planting. Fertilizer was poured evenly over the surface of each soil bag, and irrigation was kept to a minimum until emergence. Weekly fertilizing consisted of three teaspoons concentrated seaweed and 6 tablespoons concentrated fish emulsion to two gallons water; two cups per bag per application.

The ginger sprouted on May 27th, 57 days after planting. Weekly fertilizing continued, but was applied via foliar spraying.

On July 9th and 10th, we noticed some fungus gnats and decided to dig up any roots that had not sent up shoots. We removed 22 pieces (of the 300 planted). The ginger averaged 32 inches tall at this stage and was overdue for its first hilling. (The first hilling could have been added when the plants reached 24 inches tall). Soil medium ratio used for hilling was Premium Lite potting soil, with 2 cups gypsum and 6 tablespoons 5-4-8 fertilizer per bag. Two inches of hilling soil was added to each bag. Additional hillings occurred on July 19th and August 8th.

Harvest began on August 29th, 152 days after planting, and continued three times a week over the next 6 weeks until October 11th. The bags were cut open and the soil and rootlets were removed. We washed the ginger by plunging it into tubs and spraying it with water. The clean ginger was placed into plastic bags and kept cool until sale. We sold all the ginger within a day of each harvest, therefore long term storage was not an issue.

All ginger was sold with or without stalks (customer choice) retail at farmer's market. The retail price was $20/pound. We did not sell any wholesale.

Record keeping occurred throughout the experiment. Daily high and low temperatures were recorded, as well as high and low soil temperatures. We measured pH bi-weekly, which was always within our target window of 5.5-6.5. Vegetative height in inches was recorded bi-weekly, as well harvest yields and comments on quality.

6. Results

Experimenting with growing ginger indoors in the Northeast resulted in a beautiful product, enthusiastic customer response and interest, and helpful publicity. The ginger grew into 209 pounds (mother root weight excluded, although it is useable for ground spice ginger, we only marketed and sold the young ginger and stalks.) We sold all of the young ginger with stalks at farmer's market; totaling $4,180 revenue.

The ginger project was filled with unexpected surprises and observations. One of the first unforeseen needs was reinforcement under each of the greenhouse tables due to the weight of the ginger bags. We used cinder blocks and two by fours to reinforce the tables.

The soil bags proved to be a weak way of containing the plants. We altered our original idea of using bulb crates under the soil bags, and decided to plant the soil bags without crates. This was not a good alternative to our original idea. The plastic sack deteriorated quickly in the sun and made hilling (rolling up the bags) difficult, water retention inconsistent (deterioration holes in the bags would allow water and soil to wash out of bag), and harvest challenging (tiny bits of plastic all over). The soil bag concept was good, but the plastic fiber weave has to be reconsidered. Planting directly into bulb crates may a reliable alternative.

After each hilling we noticed some leaf tip burn, and speculate that the fertilizer in the hilling mix needs to be added more gradually.

In late June, we noticed chewing from a small white caterpillar. We removed it, and a few weeks later removed a stalk that had a recent hatching of hundreds of these caterpillars. We did not find any other types of pests after that surge, nor was their any more incidence of that caterpillar.

The ginger was harvested during a time frame that fit our marketing rather than point of maximum yield. This affects the potential crop yield. Our harvest total is less

than the potential total because we began our harvest early. We were concerned that we would not be able to sell the ginger if it was harvested in a shorter time frame. Since we sold out of ginger each market and did not wholesale any, we may decide to push the marketing window further towards the maximum potential harvest window next year.

A pleasant surprise from the ginger project was the ginger root itself. Young ginger is beautiful. It is white with pinkish red streaks of color, has no skin, is virtually fiber free inside, and is very tender. Stalks can be used for tea or soups, much as lemongrass is used. The young ginger is far less fibrous than typical store bought ginger, and customers responded enthusiastically over the lack of fibers or tough skin. Customers walking by our booth at farmers market stopped mid-stride to inquire. It smelled, looked, and tasted great, and customers gave us lots of positive feedback.

7. Conditions

The ginger grew on five tables in the center of a 25' X 100' greenhouse heated by propane with a radiant heat system. Ventilation was achieved by a thermostatically controlled peak-vent. Large fans circulated air. Spring was exceptionally cloudy, wet, and cool. Summer had a few very hot weeks, but most of the summer was normal. Fall was exceptionally long and mild. We suspect that the ginger would have emerged earlier had it been a warmer spring. The ginger plants showed minimal negative effects of the excessive heat during the summer. On August 3rd we began closing the greenhouse each night and by August 13th we closed it completely for the season and programmed venting to occur at 80 degrees in the heat of the day. Towards the end of the season, we noticed the plants paling, perhaps due to lower amounts of sunlight and cooler temperatures.

8. Economics

The cost of production was higher than the gross income. The total gross income from the ginger was $4,180, while the annual expense (including utilities and one third of amortized costs) was $6,397. The new customers to our stand and business resulting are an additional, though non-quantifiable, value of the ginger.

The overall cost of the project was slightly lower than expected. The amount of materials needed and their costs were less than budgeted. Items such as the irrigation system, soil mixing tub, and pH test kit were more expensive, while the cost of plastic crates, bulk ginger, soil bags, and fertilizer were less than expected. We also used much less soil than anticipated. Keeping an accurate record of labor time proved to be very difficult. There were many short tasks, brainstorming, and times of observation relating to the project that were difficult to quantify.

The yield was lower than expected. We had anticipated harvesting an average of ten pounds of young ginger per bag, but averaged just over two pounds per bag.

9. Assessment

Growing ginger in a greenhouse in the Northeast is a possible option to maximize greenhouse space, bring a new local product to the area, and has the potential to increase a farm's profits and sustainability. The next step with this ginger experiment is to adapt the production method to optimal growing conditions and market/sales schedule. This may include starting the ginger earlier in the season, adjusting fertilizer amounts, and trying to increase the average air and soil temperatures.

Ideally, some harvested root would be reserved and stored for mother roots the following year. We are saving a few plants to see if the ginger can over-winter and provide a larger yield in its second season; and a few plants will be used as a source of mother roots.

Next year we will experiment with growing it directly in the ground in an unheated structure. This would reduce soil costs and greenhouse space needs (although hoophouse structures are valuable real estate also.) It would also decrease labor time, which was a huge expense.

Other tropical and sub-tropicals may also be viable crops for greenhouse cultivation.

10. Adoption

We are enthusiastic about growing ginger again next year. The product quality was high, as well as the demand and interest. The latter season sales window for the ginger fit well into our other crop sales, when our customer loyalty has been securely built, and the ginger sales helped market income when annual cuts were waning.

Ideally, we would like to begin harvesting the ginger earlier, to maximize the window of harvest. We speculate that adding heat to the ginger in the early stages would cause emergence sooner, and would likely increase yields as a result. Whether or not added heat (through heat mats) would increase yields and be cost effective remains to be seen. We would like it to use less greenhouse space in the spring, when plug trays are high priority. The crates might be able to be stacked until emergence, or rhizomes could be rooted in medium and then transplanted.

11. Outreach

We hosted two tours of our ginger project. One was arranged privately and the other was advertised and concurrent with the NOFA Summer Conference (See Tour Flyer attached). The private tour had over forty attendees, comprised mostly of young farmers or farm workers with interest in taking on farming as a career. The public tour had eight attendees, a few local farmers or farm workers and a few conference attendees with plans to create a small farm. We also kept a notebook explaining our project, data collection, and a timeline of photos next to the project for anyone who was interested in learning about the project during times when we were unavailable. (See Photographs attached).

On Wednesday, September 13th, the Boston Globe published an article about our ginger experiment, written by food writer Emily Schwabb (See Article attached). This publicity was very beneficial to our sales, and some readers came to market for the first time because of it.

12. Report Summary

The purpose of growing ginger in a Northeast greenhouse was to expand the uses of the greenhouse resource, create a new local product, and increase profit and sustainability for the farm. The ginger was planted in the Spring into bags of soil and grown entirely in the greenhouse, which creates a zone 10 environment. Ginger was monitored for pH, soil and air temperature, and foliar height. In late summer, the ginger was harvested regularly for six weeks and sold at farmer's market. The ginger was spicy and flavorful, skinless, and had a smooth texture without inner fibers. Response at

market was excellent and the addition to our product line was very compatible. Further adjustments are needed to make this a profitable crop for Northeast farmers. The potential seems tangible and we are eager to continue to explore the sustainability of growing ginger again next season.

Melissa J. Bahret — 12/11/06

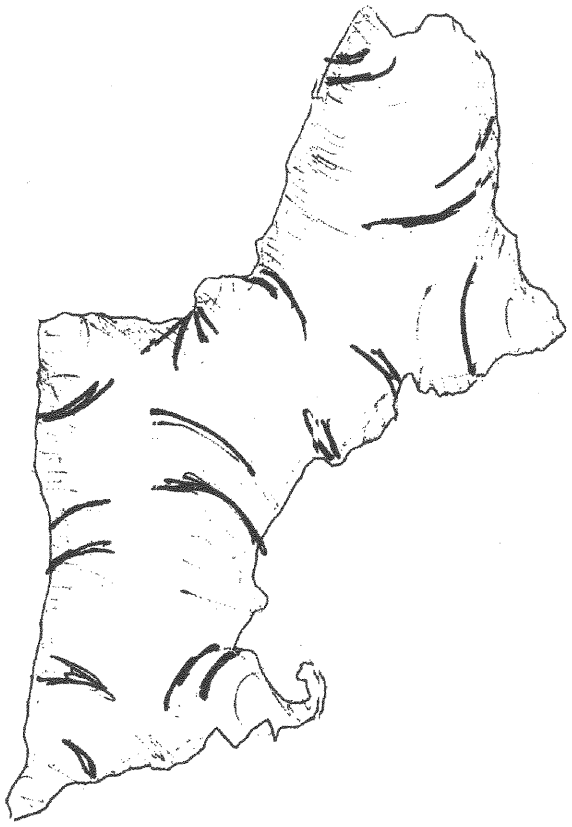
Melissa J. Bahret — Date

Attachments Include:

- Project tour flyer for the 2006 NOFA Summer Conference.
- Photographs of the ginger growing process and product.
- Boston Globe article about the project.

Is this the NORTHEAST?

Or is this GINGER ROOT?



OR... COULD IT BE BOTH ?!?!

We invite you to a tour of our SARE grant experiment: Growing culinary ginger as a way of utilizing greenhouse space during the summer.

8 AM-9:30 AM
Sunday, August 13th

For more information, please call 413-253-9182.

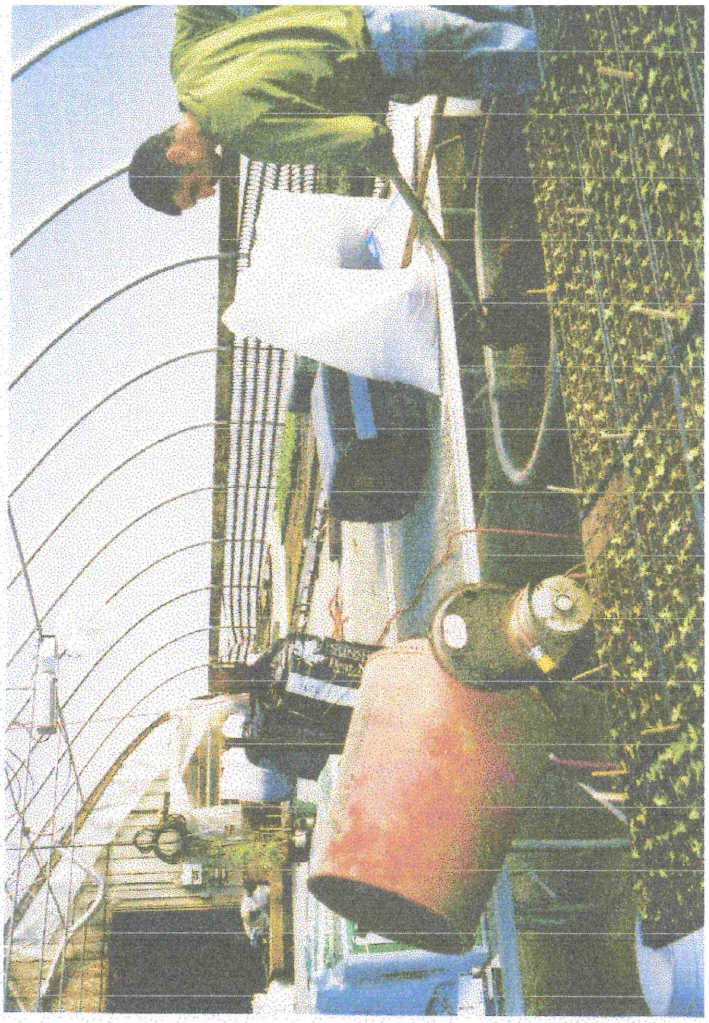
Directions to Old Friends Farm: 593 South Pleasant Street, (Rt 116), one mile south of town. From the center of Amherst, take 116S. In less than a mile you'll see signs for the Hitchcock Center and Common School on the right. Shortly after, a sign "Bramble Hill Farm". Turn right, travel up dirt road, over two culvert/speed bumps, turn left towards greenhouses. Park in lot between larger greenhouse and barn. Directions from the NOFA Conference: Travel north on 116 (towards Amherst), through two lights, then take left at sign labeled "Bramble Hill Farm" (across from Amherst Public Works). Continue as directions above.

Old Friends Farm

Iced Ginger Honey Tea

CERTIFIED NATURALLY GROWN

Made with our own ginger!




Flavorful
GREENS
MIX

GLOBE PHOTOS BY AMY TOENSING FOR THE BOSTON GLOBE

At Old Friends Farm in Amherst, Casey Steinberg (left) and Missy Bahret are experimenting with the feasibility of growing ginger in New England. They are growing their first crop in 5-pound soil bags in a greenhouse on the farm (below).

Growing ginger adds snap to this NE farm

By Emily Schwab
GLOBE CORRESPONDENT

AMHERST — Greenhouses are a relatively common sight in chilly farm country like New England. Missy Bahret of Old Friends Farm likes to call them "little Hawaiis all over the Northeast".

The greenhouse on a hillside just outside the center of Amherst is one of the few filled with ginger plants. Yes, ginger — something more common in tropical climes like Hawaii, where much of the domestic crop is grown (though in fields, not greenhouses). In this spot, Bahret and her business partner, Casey Steinberg, run their farm on land and greenhouse space they rent from Open Field Foundation. "It would be so easy for us to grow 20,000 mums" in the greenhouse, says Steinberg, "but we don't really like mums. We love ginger."

Entering the large greenhouse does not automatically bring to mind the tropics, even though visitors are greeted with row upon row of bright green bamboo-like stalks, standing tall in more than a hundred 5-gallon soil bags. On a recent cool, drizzly day, the temperature inside hovered around 68 degrees, though on hot, sunny days, the two say, the digital thermometer inside easily surpasses 100.

Part of Bahret and Steinberg's plan is to test the local sustainability of their new crop. That means an ongoing debate about whether to actually use the greenhouse's heating system. So far they have used it sparingly, only during the chilly days and nights of spring, and the crop has thrived. "The ginger had to work with us," explains Bahret, rather than the other way around.

Bahret and Steinberg, both 30, met at the University of Vermont, where they both attended what is now the Rubenstein School of Environment and Natural Resources. This is the pair's third year running Old Friends Farm (that's how they describe each other), but their first harvesting ginger. They are better known for their cut flowers, salad greens, and shiitakes, all grown in the surrounding fields. This year, they applied for and received a $7,000 grant from Sustainable Agriculture Research and Education so they could test the feasibility of growing ginger in New England.

The duo ordered a case of organic ginger from Hawaii and chopped the roots into 2-inch pieces. In early April, they buried three in separate soil-filled bags. Like potatoes, explain the growers, the number of sprouts you get depends on the number of eyes left in the stubs. Beginning in August, when the bags were sliced open and the roots uncovered, the air smelled pungently of ginger, they say.

Young, skinless ginger is paler and much less fibrous (indeed, it is barely stringy at all) than store-bought ginger. Bahret recommends sauteing shiitakes with chopped ginger and garlic. "We're also sushi fanatics," she says. She likes to slice ginger thinly and serve it as a wasabi substitute with her own fresh tuna rolls.

A favorite drink is ginger "tea," a concoction of roughly chopped roots and stalks boiled in rapidly bubbling water, which intensifies the taste, then sweetened with honey. When they go to farmers' markets to sell the root (about $5 for 4 ounces), they also offer an iced version of their ginger tea. The ginger farmers often drink theirs without straining. They've been known to chew on an occasional raw chuck of the root as well. The more ginger the better, they say.

Old Friends Farm ginger is at the farmers' market in Copley Square on Tuesdays and Dewey Square on Wednesdays.