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2022 Urban Food Systems Symposium

The Biggest Grower - A youth gardening competition for growing specialty crops and urban farmers

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Abstract

Youth today have tendencies for unhealthy lifestyles, being sedentary, consuming high fat diets low in fruits and vegetables, all contributing to child obesity, type 2 diabetes, hypertension, and precedence for life-long health concerns. School lunch programs provide opportunity for youth to consume balanced diets but does not make a significant change in lifestyle. Research has identified that youth participating in gardening at home were positively impacted with making lasting healthy choices by improved knowledge and garden connection. For rural and economically disadvantaged urban households, poor diet is directly attributed to the inaccessibility of fresh produce, affordability and understanding of preparation of various specialty crops. Through a grant from the NE Specialty Crop Block Funding Program, The Biggest Grower Competition (BGC) was developed as a summer extension education program for youth in 8th through 12th grade. Project goals included; provide educational materials on gardening, benefits of consuming fresh edibles, and entrepreneurship opportunities; to have participants grow their own crops, collect productivity data, record method of distribution; and, measure behavioral changes in consumption of specialty crops for individual and family. Programs were completed at participants individually during the period of June 1 – August 12 in each of 2020 and 2021. Each developed their own 8 m² garden (or container collection) and participated in 10 weekly asynchronous virtual educational modules (1 hour per week) and routine synchronous virtual meetings with their Garden Mentor. Participants were invited to come to the University of Nebraska-Lincoln campus (2021) on week 4 for a one-day, no cost program with engagement activities, garden tours, exploration of agriculture technology, and to network with agriculture specialists. Incentives for participation included receiving a multi-action gardening tool, educational book, assorted seeds, colorful logo stickers, and an official contestant t-shirt. Records were maintained of harvest poundage and distribution method. The top eight producers received gift cards in varying amounts as an incentive for ongoing participation and complete submission of data. In 2020, there were 44 participants in which 57% were new to gardening and, for 2021, 17 participants in which 25% were new gardeners. Yearly individual garden production averages were 21.55 kg and 23.13 kg respectively with a total of 1,118.56 kg of fresh produce grown. Through a post-experience survey, daily produce consumption rate increased from 12.5% to 36.4%, 72% of the participants tried a new vegetable/fruit recipe, 91% indicated produce grown was consumed by family, and 18% was donated to food banks.

Keywords: community garden, dietary habits, food security, STEM education, vegetables

INTRODUCTION

Youth today are disconnected with agriculture and the importance of the consumption of a healthy balance of food types that include fresh fruits and vegetables. Families often engage in individual interest areas and less often share in activities together. With busy lifestyles and the ease for convenience and fast-food restaurants, unhealthy dietary habits are prevalent (Birch and Fisher, 1997; Yeh et al, 2008). Young people that do not drive and cannot personally interact with friends, often resort to social networking and gaming. This has led to sedentary lifestyles and the consumption of high fat, empty carb diets which increase the likelihood of child obesity, type 2 diabetes, and other life-long health issues (Lautenschlager and Smith, 2007). The US Department of Agriculture (USDA) administers the National School Lunch Program (NSLP) that serves more than 30 million students each day across 100,000 schools nationally (NSLP 2019 Fact Sheet). NSLP guidelines were shifted in 2010 to focus on five meal components that included fruits, vegetables, whole grains, low-fat dairy, and protein proportional to healthy guidelines and age of student (Byker et al, 2014). In research conducted on food waste after implementation of these standards, researchers found that between 10% to 45% of served food was thrown out and that proportionally food insecure students wasted most (Byker et al, 2014).

Behavioral changes are easiest for younger children, but less so for older youth as habits are more established. Research has shown that gardening activity promotes psychological well-being and improved dietary habits through increased fresh produce consumption (Libman, 2007). School and extension programs have been developed to teach young children about the food system and healthy nutrition but there are limited resources for older youth (Yeh et al, 2008). Communities have increased awareness of local foods and support agricultural connections through sponsorship of farmers' markets, community gardens and local Community Supported Agriculture (CSA) or pick-your-own operations (Lautenschlager and Smith, 2007; Libman, 2007). Research has found that home gardening projects make the greatest dietary behavior impact when exploring various food consumption intervention approaches (Berti et al, 2003).

In Nebraska, gardening programs are popular for elementary schools and community centers for engaging youth in growing edible crops and to learn the importance of healthy eating. For those in secondary school, vocational agriculture education and 4-H programs are offered but generally serve those in rural communities. More than 65% of Nebraska's population live in the 12 metro counties that encompass Omaha, Lincoln, Grand Island and South Sioux City and, of which since 2000, there has been a 25% increase in individuals under the age of 20 (Center of Public Affairs Research, University of Nebraska-Omaha, 2020). To reach these older urban youth about urban food production, a summer-long program was created and evaluated by extension specialists from the University of Nebraska-Lincoln (UNL) Department of Agronomy and Horticulture (AH). The program was designed with four overarching goals; develop an agriculture focused STEM education program, engage older youth in gardening, increase the availability and consumption of fruits and vegetables, and introduce educational and career opportunities in agriculture.

DISCUSSION

Students majoring in agronomy and horticulture at UNL have been decreasing since 2014, a downward shift from 341 to 209 in 2019 (39% reduction pre-pandemic impact). Students that changed majors to AH indicated they originally thought agriculture was row crop farming and unaware of the vast career opportunities that existed in the majors. To reach the increasing number of urban youths this program was created to offer a summer activity to build interest and self-confidence in growing food crops. Consideration was given to existing FFA and 4-H programs however these are well established to serve rural youth and have limited presence in urban

communities. Nebraska Department of Education emphasizes collaborative experiences at school, home, and community as context for helping students master key competencies in Science, Technology, Engineering, and Math (STEM). During the development phase of this gardening program, consideration was framed around offering something to do for those in secondary school without a summer job to encourage healthy activity through gardening, improve food consumption behavior, increase availability of fresh foods to family and community, and provide STEM education through exploration of plant production.

Program

A competition emphasis was chosen as the platform to encourage participation in the gardening program titled “The Biggest Grower Competition” (BG). A logo (Figure 1) was created for use on all educational materials, communication, and participant swag. Grant funding allowed the program to be offered at no charge to participants. Assurance was given that no previous experience was required, and that guidance was given through instruction and interaction with a peer garden mentor. Participants could use existing home garden space, or they could compete as a container gardener in which grow bags would be supplied to them. Container gardens provided an option as urban youth may have property use restrictions or risk of urban soil contamination. Both in-ground and container gardens were limited to a maximum production area of 8 m². Seeds, cultivation tool, gardening handbook, and cloth grow bags (as requested) were provided to participants. Though each grew their own home garden, they were placed into 4-member teams to meet for weekly Zoom sessions with the garden mentor. This was to build camaraderie, strengthen mentor relationship, and motivate one another during the competition. The peer garden mentors were AH undergraduate students at UNL and could best relate to this age group. The program content and mentor guidance were under the direction of the authors of this publication.



Figure 1. Chillin’ Tomato logo developed for educational materials and promotional items

Students throughout the summer were incentivized to continue participation. Upon registering, each received a “quick-start gardening” package that included BG stickers, *The New Gardener’s Handbook* by Daryl Beyers (Timber Press), seeds, and gardening tool. On the 4th week participants came to Campus Day (2021) to meet with the garden mentor and various AH research and teaching faculty. Activities included touring the Backyard Farmer gardens, attempting asexual plant propagation techniques, constructing a Kratky hydroponics system, using scientific data

collection tools, trying landscape drawing, and touring AH facilities and UNL east campus. On the 8th week participants received their official BG t-shirt. Produce counts and weights were collected as harvests began (week 7) and continued through the end of the 10th week. Team member weights were combined to determine top performing teams. Amazon gift cards were given to each member of the top 3 placing teams with funding provided through a non-government organization. The first-place team members each received \$50, second place \$25, and third place received \$10.

Educational Content

Educational content was deployed weekly through asynchronous learning modules placed on a shared folder in Google Drive. Curriculum was aligned with activities participants might encounter that week in their garden and aligned STEM with activity (Table 1). Teams met weekly on Zoom with the garden mentor to discuss the video and learning objectives for the module content, discuss participant gardens, and identify solutions to problems. Team meetings occurred for 6 weeks and then shifted to open Zoom hours in which participants could reach out to the garden mentor for assistance. The educational modules included a learning guide that captured the essence of each week’s educational content, video PowerPoint presentation, and other supporting documents of interest.

Table 1. Biggest Grower Competition curriculum and learning outcomes.

Module	Topic	Learning Objectives
1	Garden preparation & planting	Demonstrate garden preparation, planning, & seeding Describe functions of plant root & shoot systems
2	Rich soil	Understand soil composition & textural attributes Describe soil qualities important for growing plants Provide approaches to soil improvement & sustainability
3	Water & irrigation	Summarize importance of water in plant cells Describe plant water stress indicators Outline approaches to irrigating plants & water conservation
4	Plant nutrition	Summarize macro & micronutrient elements required for plants Recognize where to find nutrient information on fertilizer labels Discuss organic approaches to soil fertility
5	Hydroponics	Describe the fundamentals of hydroponic plant production Discuss hydroponics as an urban accessible food production system Create a Kratky system for home exploration
6	Plant stressors	Discuss cultural and environmental stressors affecting plant health Interpret plant health and indicators Formulate recommendations for treatment approach
7	Beneficial biologicals	Characterize the garden ecosystem Recognize pest and beneficial organisms in the garden Describe environmentally conscious pest control approaches
8	Flowers, fruits, & seeds	Describe the life cycle of annual and perennial plants Identify flower parts Discuss factors that enhance pollination and fertilization

9	Food consumption & safety	Compare fresh foods to processed foods Summarize food production and distribution channels Outline safe produce post-harvest handling until final consumption
10	Entrepreneurship & careers	Define entrepreneurship Discuss opportunities for specialty crop marketing Explore diverse agricultural/horticultural career opportunities

To strengthen connection with the garden mentor, special topics were added each week for the mentor to challenge the participants to try for themselves. These topics were coined either “Christine’s Cool Concepts” or “William’s Ways” and included such activities as; making mud milkshakes to determine soil composition, mulching gardens with yard waste or repurposed items, building a beneficial bug house, making a gravity drip irrigation system, crafting a bird scare device, and cooking a recipe that included as many vegetables as possible.

Implementation

The grant funded concept for this program was to do team gardens that the mentor would conduct site visits throughout the summer. In March 2020, pandemic restrictions prevented implementation as intended. Given the funding timeline and the realization that individuals were on lock-down at home, the program was modified to a virtual event with a home gardening engagement activity. A webpage, press release, and registration portal were developed and shared statewide. This differed from the specific urban communities intended for this grant, however, given the pandemic provided an outreach opportunity for individuals statewide. Registrations for 2020 were accepted during the month of May and the program occurring from June 1st through August 12. Given restriction uncertainties for the summer of 2021, a virtual program was presented during the same time but included an in-person campus day on June 25, 2021.

Findings

There were 44 participants during the 2020 program that included ten 8th graders, eight in 9th grade, fourteen 10th graders, and twelve in 11th grade. Of these, 57% came from a family with limited or no previous gardening knowledge. The participants were principally from urban locations in communities statewide, however, there were two that were in remote locations on ranches in the sandhills that enjoyed the opportunity to do this activity by virtual platform. The participants grew a total of 841 kg of produce (n=39) with an average of 21.55 kg per participant, ranging in productivity from 6.35 kg to 228.61 kg. Through a post-experience survey, there was no indication of a change in daily produce consumption rate likely due to the question format, 62% of the participants tried a new vegetable/fruit recipe, 73% indicated produce grown was consumed by family and 28% was given to friends and neighbors .

For the 2021 summer program, there was a total of 17 participants comprised of four 9th graders, five in 10th grade, five in 11th grade, and three in 12th grade, of which 25% had not gardened before. A total of 277.60 kg of produce (n=12) was grown with an average of 23.13 kg per participant, ranging in productivity from 2.54 kg to 87.54 kg. Through a post-experience survey, daily produce consumption rate increased from 12.5% to 36.4%, 72% of the participants tried a new vegetable/fruit recipe, 91% indicated produce grown was consumed by family, and 18% was donated to food banks.

Participation remained high for 2020 where 88.6% completed the entire program and submitted final data. In 2021, participation dropped to 70.6% before submitting final data, related

to pandemic restrictions being lifted and feedback by individuals indicating conflicting activities. Program satisfaction was evaluated through post-experience surveys for the two years using a numerical rating system of 5=excellent to 1=poor. Learning content response ratings (n=50) were 5= 50%, 4=48%, 3=8%, 2=4%, and 1=0%. Likelihood to recommend program to others were 5=58%, 4=30%, 3=8%, 2= 2%, and 1=2%. Positive comments included enjoying the competitive aspect of the program, having the peer garden mentor, learning how to grow new things, and the campus day that let them see behind the scenes and do activities. Comments for improvement were all related to the need for the competition to last longer as harvests were just beginning at the end of the 10-weeks.

CONCLUSION

This competition was developed as an agriculture focused STEM education program that engaged older youth in gardening. Impact goals were to increase the availability and consumption of fruits and vegetables and introduce educational and career pathways in agriculture. The BG program provided a tremendous outreach opportunity to youth and families during a challenging time, offering interpersonal connection and activity while in pandemic isolation. The competitive approach to STEM learning outside of the classroom kept most participants fully engaged until program completion. Scheduling Zoom meetings and maintaining attendance was challenged by youth sports, summer camps, jobs, and family vacations, particularly as pandemic restrictions eased. This no-cost to participate activity provided an inclusive experience for individuals statewide, in which feedback shared by parents indicated how thankful they were for the program at this time.

In times of normalcy, this age group has many activities that make it difficult for the commitment needed for successful summer gardening. This program worked well for this time and illustrates how gardening outreach can allow interpersonal connection and improved personal well-being during stressful times. Though dietary habit was not significantly changed because of this program, fruit and vegetable harvests were significant and increased availability and use by family and community. Participants for the Campus Day indicated they enjoyed the experience of engaging with agriculture researchers and educators to learn of opportunities in agriculture.

Organizational partnerships or private donors should financially support programming of a program such as this to reach those who would benefit from the program most. Grant funding was used to develop and present this program free to youth in NE. It served a need and was rewarding to those who participated. It is apparent that for future success for this age group a target audience needs to be identified. This could be youth connected to community centers or participating in summer school programs so that individuals with commonalities and established relationships and support one another.

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