

USU Researchers Explore Mini Vegetable Plants for Urban Agriculture

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Sustainable

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As cities grow and farmland becomes increasingly distant from consumers, Utah State University researchers are exploring innovative ways to bring food production closer to home. New research on dwarf vegetable crops suggests that compact plant varieties could play a key role in improving urban food production.

Research by USU graduate student Abigail Lazier focuses on how dwarf and micro-dwarf crops can address challenges in urban agriculture such as limited space and lighting. As urban populations continue to expand, local food production is becoming an important strategy to reduce transportation costs, minimize food waste, and improve food security.

“Urban agriculture offers powerful opportunities,” Lazier said. “But it comes with limitations, especially when it comes to space and light. Our research looks at how plant genetics can help overcome these challenges.”

Dwarf crops are specifically bred to be smaller in size while maintaining productivity. Researchers evaluated 10 dwarf tomato cultivars grown under three different light levels to better understand how plant size and light interact. The results showed clear differences among varieties, with certain plants exhibiting highly compact growth while still producing significant yields.

One key finding is that while larger dwarf plants produced more fruit per plant, smaller cultivars often outperformed them when efficient use of space was considered. When measured by yield per unit area or volume, highly compact varieties, such as “Twiggy” and “Red Velvet,” proved to be highly efficient, making them ideal for container gardening, vertical farms, and indoor growing systems.

Light availability also played a critical role. Researchers found that increasing light levels not only boosted overall yields but also accelerated fruit maturity. Plants grown under higher-intensity light produced more ripe fruit in less time, highlighting the importance of adequate lighting in indoor and greenhouse systems.

Interestingly, higher light levels were also associated with smaller plant sizes in some cultivars. This suggests that plants require less vegetative growth when sufficient light is available for photosynthesis. This combination of higher yield and reduced size further enhances the suitability of dwarf crops for confined spaces.

The research also points to practical considerations for potential growers. For growers with limited space, compact varieties that maximize yield per square foot may be the best choice. Meanwhile, ensuring sufficient light, whether from natural sunlight or supplemental lighting, is essential for achieving optimal results.

Beyond tomatoes, researchers expect similar trends to apply to other dwarf crops, including peppers and peas. The goal is to develop accessible, low-maintenance systems that allow individuals, schools and communities to grow fresh produce year-round.

“This work is about making food production more accessible,” Lazier said. “Even small-scale growers can produce meaningful amounts of food with the right tools and plant varieties.”

For more information about this and related projects, visit the [Sustainable Environment Agriculture Laboratory](#) website.

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