Dwarf Tomato and Dwarf Pepper as Potential Space Crops

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Crops for space life support systems and in particular, early supplemental food production systems must be able to fit into the confined volume of space craft or space habitats. For example, spaceflight plant chambers such as Svet, Lada, Astroculture, BPS, and Veggie provided approximately 15-40 cm of growing height for plant shoots. Six cultivars each of tomato and pepper were selected for initial study based on their advertised dwarf growth and high yields. Plants were grown in 10-cm pots with solid potting medium and controlled-release fertilizer to simulate the rooting constraints that might be faced in space environments. Lighting was provided by fluorescent lamps (~300 umol m^{-2} s^{-1}) and a 16 h light / 8 h dark photoperiod. Cultivars were then down selected to three each for pepper (cvs. Red Skin, Pompeii, and Fruit Basket) and tomato (cvs. Red Robin, Mohamed, and Sweet n' Neat). In all cases (pepper and tomato), the plants grew to an approximate height of 20 cm and produced between 200 and 300 g fruit fresh mass per plant. In previous hydroponic studies with unrestricted root growth, Fruit Basket pepper and Red Robin tomato produced much larger plants with taller shoots. The findings suggest that high value, nutritious crops like tomato and pepper could be grown within small volumes of space habitats, but horticultural issues, such as rooting volume could be important in controlling plant size.