

Public Breeding Program Update: The Ohio State University

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The Ohio State University's Ohio Agricultural Research and Development Center (OARDC) has a history of tomato breeding and genetics research dating back nearly 100 years. Current efforts focus on processing tomato varieties adapted to humid growing conditions. Through OARDC branch farms we maintain a large field-based program, and we evaluate selected hybrids through the Food Industries Center pilot plant. The breeding program continues to develop commercial quality parents and hybrid varieties targeted to whole-peel and diced end use. Research projects are structured to add value to germplasm through establishing linkage between molecular markers and traits of importance. We focus on yield, disease resistance, and fruit quality. Our disease resistance research targets bacterial spot and bacterial canker because the diseases are regionally important. Pilot projects for viral resistance and Phytophthora resistance are under way in cooperation with BYU and North Carolina State University. Fruit quality projects focus on color and color uniformity. In addition, we developed a set of genetically related stocks that vary in carotenoid concentration and structure. These lines are suitable for machine harvest and processing, and have been evaluated in human studies to assess adsorption in the diet. Continuing studies in human volunteers and mouse models are being conducted to establish the biological role of tomato carotenoids in ameliorating chronic disease and cancer. Two projects related to fresh market tomatoes are underway: rootstock breeding for soil-based production systems, and population characterization of Spanish hanging tomatoes. We have been working with grafted tomatoes for four years. We establish a multi-state trailing network through which 30-40 rootstocks have been evaluated for two years. We also cooperate with the University of Illes Balears (UIB), Spain, to collect and characterize "Tomatiques de Ramellet", a long-shelf-life hanging tomato from the Balearic archipelago. The collection resides at UIB, where the plants are being characterized for fruit quality and physiological parameters related to water use efficiency. In Ohio we are assessing population structure in relation to other vintage varieties and land races. Progeny from crosses are being evaluated for improved quality and resistance characteristics.