Watermelon: Fruit on the Fast Track

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ARS scientists Pat Wechter (left) and Amnon Levi have identified and characterized key genes regulating growth and development that enable watermelons to grow from tiny flowers to plus-size, market-ready produce in only five weeks.

(PhysOrg.com) -- Agricultural Research Service (ARS) scientists are studying how watermelons grow from tiny flowers to plus-size, market-ready produce in only five weeks. Their findings have resulted in the first reported large-scale study that identified and characterized key genes regulating watermelon growth and development.

The researchers included plant geneticist Amnon Levi and plant pathologist Pat Wechter at the ARS U.S. Vegetable Laboratory in

Charleston, S.C. Plant geneticist Karen Harris at the ARS Crop Genetics and Breeding Research Unit in Tifton, Ga., plant geneticist Angela Davis at the ARS South Central Agricultural Research Laboratory in Lane, Okla., and molecular biologist Jim Giovannoni at the ARS Robert W. Holley Center for Agriculture and Health in Ithaca, N.Y., also contributed to the research.

Tissue was taken from watermelons at three distinct stages during growth and ripening. Then the team analyzed RNA from all the tissue samples and used the RNA to develop a library of genes called expressed sequence tags (ESTs), which are unique gene segments involved in different aspects of development and metabolism.

The researchers found that these genes were active in metabolism, cell growth, cell development, and transporting nutrients and other substances across cell walls. The genes also came into play in cell division, cellular communication, DNA copying, plant defense and stress response.

The scientists also found a large number of ESTs that appear to be modulated in the fruit during development and ripening. But they can't match them up with any other known plant ESTs, so they may be unique to watermelon.

This information could benefit plant breeders and watermelon producers alike. Since cultivated watermelons are not genetically diverse, they are more vulnerable to pathogens and environmental stresses. So finding sources of genetic resistance to watermelon diseases is essential to the continued success of U.S. production.

Results from this study were published in Biomed Central Genomics.

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