Sol Newsletter

Issue number 33
June 2012
Editor: Joyce Van Eck

In this issue

Community News

Tomato Genome Published

Joyce Van Eck

There is a quote by an unknown source that "Every accomplishment starts with the decision to try." Well, in November 2003, a group of researchers from around the world convened in Washington, D.C. to formulate a plan to carry out the decision to sequence the tomato genome. This decision led to the generation of a high quality reference genome, which was published in Nature on May 31, 2012 (http://www.nature.com/nature/journal/v485/n7400/full/nature11119.html).

A flurry of media attention resulted in press releases, newspaper articles, and online reports where many of those involved in the sequencing project were interviewed. By doing a Google or similar browser search for "tomato genome", you will find many of the articles. There are over 300 authors on the tomato genome publication and all involved should be proud of this accomplishment that will serve researchers well in their efforts to understand not only the intricacies of the genome, but also evolutionary influences and the biology that led to the tomato as we know it.

UC Davis Plant Breeding Academy

A Premium Professional Certificate Program for Plant Breeders

Established in 2006 to address the global shortage of trained plant breeders, UC Davis Plant Breeding Academy (PBA) has grown into a premium professional certificate program widely recognized by the global seed industry.

Through three classes in Davis and two in Europe, PBA has trained 85 plant breeders representing 46 plant breeding organizations from 20 different countries. At invitation of and in cooperation with Asia & Pacific Seed Association, the Asian Plant Breeding Academy will start in November of 2012. A version of the Plant Breeding Academy is also planned for Africa starting in the second half of 2012.

The students and employers find a great value in this program, resulting in participation and recognition by the seed industry such as: European Seed Association Outstanding Student Award, Bayer Crop Science Scholarship, etc. A recent survey of UC Davis Plant Breeding Academy (PBA) graduates shows that the program has a significant impact on both the employer and the graduate-employee. Almost 90% of surveyed graduates agree that they became more productive employees and that the complexity of their tasks and duties have increased as a result of the PBA training.

The UC Davis Plant Breeding Academy is a professional certificate program that covers the fundamentals and the most recent developments in plant breeding theory and practice. Employers appreciate the opportunity to provide their valued employees advanced training without disrupting their full-time employment. Participants attend six 6-day sessions at UC Davis. The instructors are internationally recognized experts in plant breeding and seed technology.

UC Davis Plant Breeding Academy 2012 Class begins in September. Applications are now being accepted. For more information on the UC Davis Plant Breeding Academy visit http://pba.ucdavis.edu or contact Joy Patterson, jpatterson@ucdavis.edu.

NAPB Annual Meeting: Sustaining Life through Plant Improvement

August 6 - 8, 2012 in Indianapolis, Indiana

The National Association of Plant Breeders will hold its annual meeting August 6 - 8, 2012 in Indianapolis, with the theme of "Sustaining Life through Plant Improvement". The annual meeting is an opportunity for breeders and allied scientists to stay updated on recent innovations in plant science and to discuss public policy issues relevant to plant breeding. The meeting also provides an important venue for graduate students to present their research, meet with potential employers, and become acquainted with plant breeding graduate students from other universities. This year's meeting will be hosted by Dow AgroSciences.

More information and registration for the meeting is available at www.plantbreeding.org. Early registration ends June 1.

NAPB is an organization of public and private sector individuals associated with or interested in the science or business of plant breeding. It is a strong proponent for maintaining and enhancing public plant breeding research and education programs.

Tomato Breeder's Roundtable

February 6 – 8, 2013 in Chiang Mai, Thailand

The Tomato Breeder's Roundtable (TBRT) started as an informal meeting of tomato breeders in 1955. Over the past five decades the TBRT has become an important meeting for the international tomato research and breeding community. The informal characteristics of the TBRT, which have been preserved over five decades, offers a great forum for participants to discuss the latest developments in tomato breeding and associated technology. For more information see: http://www.tbrt2013.com/.

And the ASHS Outstanding Vegetable Publication Award for 2011 goes to …

Suping Zhou, Roger J. Sauvé, Zong Liu, Sasikiran Reddy, Sarabjit Bhatti, Simon D. Hucko, Tara Fish and Theodore W. Thannhauser for their Journal of the American Society for Horticultural Science article: Identification of salt-induced changes in leaf and root proteomes of the wild tomato, *Solanum chilense*.

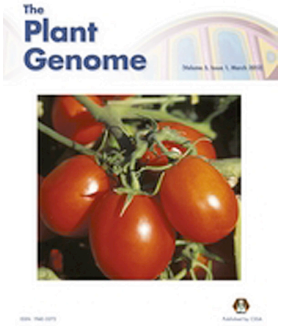
The authors received the note below from Michael W. Neff, Executive Director American Society for Horticultural Science :

Dear Drs. Zhou, Sauvé, Liu, Reddy, Bhatti, Hucko, Fish, and Thannhauser,

It is my distinct pleasure, on behalf of the ASHS Board of Directors and the Awards Committee, to notify you that your paper "Identification of Salt-induced Changes in Leaf and Root Proteomes of the Wild Tomato, *Solanum chilense*" (J. Amer. Soc. Hort. Sci. 136:288-302) has been named the ASHS Outstanding Vegetable Publication Award winner for papers published in 2011. Congratulations!

Cover Tomatoes

Tomatoes were definitely ready for their close-ups this year. These two papers, in addition to the genome publication, made the cover of their respective journals.



Hamilton JP, Sim SC, Stoffel K, Van Deynze A, Buell CR, Francis DM (2012) Single Nucleotide Polymorphism Discovery in Cultivated Tomato via Sequencing by Synthesis. Plant Genome 5:17-29.

Lee JM, Joung JG, McQuinn R, Chung MY, Fei Z, Tieman DM, Klee HJ, Giovannoni J (2012) Combined transcriptome, genetic diversity and metabolite profiling in tomato fruit reveals the ethylene response factor *SlERF6* to play an important role in ripening and carotenoid accumulation. Plant J 70:191-204.

Research Updates

Nicotiana benthamiana Sequence Update

Greg Martin

Nicotiana benthamiana is a widely used model plant species for the study of fundamental questions in molecular plant-microbe interactions and many other areas of plant biology. This popularity derives from its well-characterized susceptibility to diverse pathogens and insect pests and especially its amenability to virus-induced gene silencing (VIGS) and transient protein expression methods. To enhance the use of this species, a 37-fold coverage draft genome sequence of *N. benthamiana* was generated and is now available on the Sol Genomics Network (http://solgenomics.net/) for both BLAST searches and for downloading to local servers.

The estimated genome size of *N. benthamiana* is ~3 gigabases (Gb). The current assembly consists of ~141,000 scaffolds, spanning 2.6 Gb of which >50% are longer than 89 kilobases. Of the ~16,000 *N. benthamiana* unigenes available in GenBank, >90% are represented in the assembly. The sequence should be useful for gene mining, for retrieving promoter sequences, for designing VIGS constructs, for comparative genomics with other solanaceous plants.

For questions or additional information, contact Lukas Mueller (lam87@cornell.edu) or Greg Martin (gbm7@cornell.edu).

Update from Steve Stack's Lab at Colorado State University

Lindsay Shearer

A total of 447 BACs have now been placed on the tomato FISH map using fluorescence in situ hybridization on pachytene synaptonemal complex spreads by the Stack lab at Colorado State University. Sixty-eight of these BACs have been added since the last edition of the SOL newsletter. These new BACs, listed by chromosome arm, are: 2P: LE_Hba0012G12, LE_HBa0058D23, SL_MboI0004J02; 2Q: SL_MboI0017J13; 3P: LE_HBa0020G20, LE_HBa0037B06, LE_HBa0039C15, SL_s0002G24, SL_s0009C01, SL_s0018K15, SL_s0050E05, SL_s0086D22; 3Q: LE_HBa0028E17, LE_HBa0001H05, LE_HBa0027L13, LE_HBa0028L03, LE_HBa0030A19, LE_HBa0037N01, LE_HBa0084A03, LE_HBa0117I12, LE_HBa0244B01, SL_EcoRI0006F17, SL_EcoRI0018K21, SL_EcoRI0031G05, SL_EcoRI0034G21, SL_EcoRI0034O23, SL_EcoRI0121G21, SL_MboI0002J15, SL_MboI0003H09, SL_MboI0011B02, SL_MboI0015G06, SL_MboI0015M02, SL_MboI0023D14, SL_MboI0079O10, SL_s0003D15, SL_s0048H23, SL_s0071G06, SL_s042B23; 5P: SL_s0094J05; 5Q: LE_HBa0002J04, LE_HBa0016D20, SL_EcoRI0004N07, SL_EcoRI0012L12, SL_MboI0058F07, SL_s0031L05, SL_s0084H11; 8P: LE_HBa0015E06, LE_HBa0008J16, LE_HBa0030O09; 8Q: LE_HBa0033A16, SL_EcoRI0024O12, SL_EcoRI0027A06, SL_EcoRI0039B17, SL_EcoRI0040H01, SL_MboI0005G10, SL_MboI0007C12, SL_MboI0012P13, SL_MboI0019D14, SL_s0058J24, SL_s0078C24, SL_s0082B11; 11P: LE_HBa0004F15, LE_HBa0008F06, SL_EcoRI0018D15, SL_s0029B21, SL_s0082L15; 11Q: SL_EcoRI0027A06; 12P: SL_EcoRI0010P04; 12Q: SL_MboI0128K09.

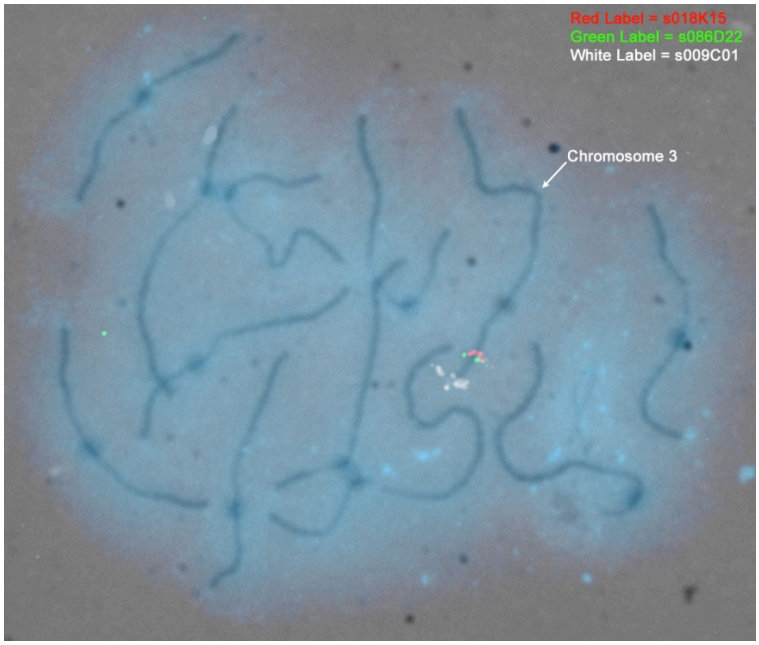


Figure 1: FISH labeling of three BACs on the short arm of chromosome 3.

The 447 localized BACs are distributed at 457 loci among the chromosomes as follows: 1 - 107; 2 - 27; 3 – 59; 4 – 28; 5 – 28; 6 – 19; 7 –33; 8 – 26; 9 – 24; 10 – 55, 11 – 27, 12 – 24. The total number of loci reflects the fact that there are now ten BACs that have each been localized to two positions. Many of the new BACs are on the borders of the sequenced scaffolds on chromosomes 3, 5, 8 and 11.

Figure 1 illustrates FISH labeling of three BACs on the short arm of chromosome 3. BACs SL_s0009C01 (white) and SL_s0086D22 (green) are at the borders of scaffold 1 (SL2.40sc04439). BAC SL_s018K15 (red) is at the border of scaffold 4 (SL2.40sc04696). We have estimated the unsequenced area between these two scaffolds to be approximately 400 Kb.

Resources

Focus on Tomato: A New PMN Webcast Resource!

excerpt from Plant Management Network News, Number 123: April 27, 2012
www.plantmanagementnetwork.org/infocenter/topic/focusontomato/

The Plant Management Network (PMN) is pleased to welcome Focus on Tomato into its family of crop management resources. Focus on Tomato is led by Dr. Tom Zitter at Cornell and Dr. Mike Davis at UC Davis, and features multidisciplinary webcasts on tomato management. Focus on Tomato currently includes six presentations covering topics such as methyl bromide alternatives, diagnostic tools, grafting, fertility, and tomato diseases. PMN would like to thank Focus on Tomato's supporters for helping to fund this important resource for the tomato industry.

Focus on Potato Webcast Discusses Internal Heat Necrosis

excerpt from Plant Management Network News, Number 123: April 27, 2012
www.plantmanagementnetwork.org/infocenter/topic/focusonpotato/

Internal Heat Necrosis, or IHN, can be an economically significant problem, particularly in the Mid-Atlantic and southern United States. In the latest Focus on Potato talk, Dr. Craig Yencho at North Carolina State University discusses IHN's symptoms and control, risk of IHN development, models to predict occurrence, and varietal resistance. To view this talk, go to www.plantmanagementnetwork.org/edcenter/seminars/potato/HeatNecrosis/.

Highlight Article

The 150 Tomato Genomes Project: Exploring Genetic Variation in Tomato by Whole-Genome Sequencing

Introducing the project

In March 2012, the 150 tomato genomes project was launched which is aimed at discovering the sequence and genetic variation in tomato. The resulting information will have broad implications for plant breeding, evolutionary studies and plant genetics, and will enable new possibilities to discover alleles underlying phenotypic diversity within tomato. Having genetic variation identified, DNA based selection of lines and markers associated with traits of interest will boost the efficiency and success rate of breeding programs.

Exploring the genetic variation is essential

In past decades, breeding and selection have been very successful for tomato. It has resulted in the selection of superior crops with desirable agricultural traits. The success is reflected by the fact that, on a global scale, tomato is economically one of the most important vegetable crops. According to the FAO (www.fao.org) in 2009 - 2010 worldwide tomato production covered some 4,837,576 ha and a massive production of 136,229,711 million tons (Fig. 1).

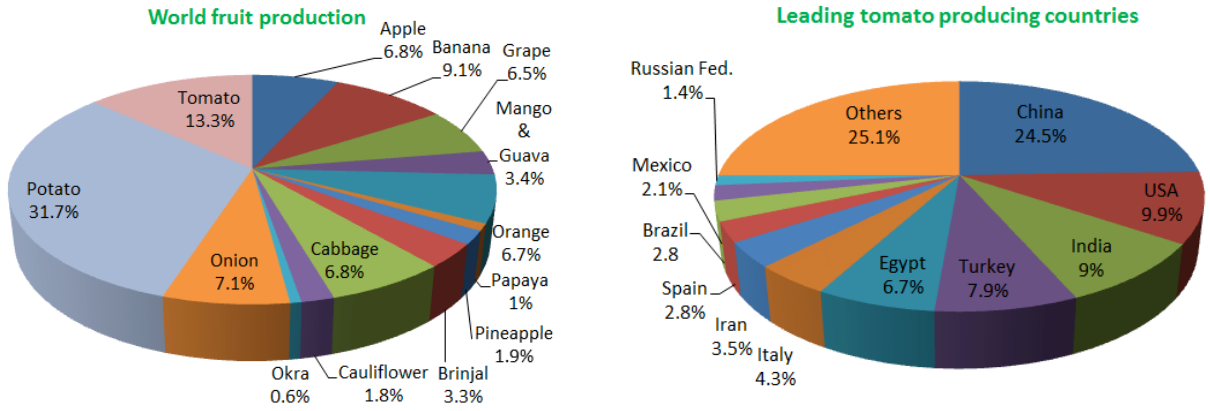


Figure 1: Overview of world tomato fruit production (left panel) and leading tomato producing countries (right panel) in 2009 - 2010 (Source FAO).

Nevertheless, tomato breeding is facing serious challenges for the near future. In the face of the rapidly expanding world population, changing consumer preferences, rapidly changing climate conditions and increasing competing claims for arable lands there is a growing demand for new varieties that can tolerate harsh environmental conditions, confer resistances against pathogens and at the same time also have better productivity and nutritional quality. However, cultivated tomato has a strikingly narrowed genetic basis through domestication that has resulted in loss of many desirable traits. A further complicating factor is that multifactorial traits involved in e.g. taste, abiotic stress tolerance and pathogen resistances are extremely difficult to improve. Fortunately, the wild relatives and early domesticated resources of tomato crops provide a gene pool that is sufficiently rich for crop improvement. To exploit the genetic variation for crop improvement, both the identification of the genetic diversity and technological advances to efficiently introduce alien chromatin into (new) breeding lines are essential.

The project partners

The 150 tomato genome consortium is a public/private partnership and brings together international industries, covering 30% of the global turnover in tomato, leading research and Dutch knowledge institutes, funding agencies and the Dutch government. The project is a Sino-Dutch collaboration of which the Chinese part is funded and executed by the Beijing Genomics Institute (BGI Shenzhen). The Dutch part is funded by the Technological Topinstitute Green Genetics (TTI GG) and the Dutch Ministery of Economic Affairs, Agriculture and Innovation. Additional funding is provided by the industrial partners. A complete list of funding agencies, companies and academic institutes that participate in the project can be found at www.tomatogenome.net .

Scope of the project

In total, 84 genotypes, including 10 old varieties, 43 landraces and 30 wild accessions have been selected for sequencing. For three wild species, *Solanum arcanum*, *S. habrochaites* and *S. pennellii* (Fig. 2) we aim to construct a reference genome from both 454 and Illumina HiSeq sequence data. A selection of 44 landraces is based on the analyses within the EU_SOL project and is aimed to explore a maximum range of expected genetic variation. A list of accessions is made available on the project home page at www.tomatogenome.net. Furthermore, some 60 F8 individuals have been selected from a *S. pimpinellifolium* RIL population for low depth sequencing with the aim to study recombination at the sequence level. Currently, sequencing of 84 genotypes and RILs has been started by BGI and WUR Plant Research International. We expect to make the data publically available around July 2013.

Figure 2: Inflorescence of *Solanum pennellii* accession LA0716, one of the accessions targeted for sequencing.
Source: Tomato Genetics Resource Center (http://tgrc.ucdavis.edu).

The present project is a first step in exploring a wealth of genetic diversity present within tomato. It will pave the way to further strengthen the position of the collaborating seed industries and stimulate collaborative initiatives, knowledge infrastructure and economic development.

Further information: b.degeus@groenegenetica.nl (TTTI Green Genetics), sander.peters@wur.nl (PRI Bioscience), or richard.finkers@wur.nl (WUR Plant Breeding).

On behalf of the consortium partners,
Sander Peters – Plant Research International

Job Announcements

Program Manager – Education and Outreach in Plant Breeding and Genomics

A position is available as a program manager with the tomato breeding and genetics program at The Ohio State University. The opportunity is ideal for someone interested in science education and outreach, and will involve creating and organizing continuing education materials for plant breeders. The program manager will oversee outreach content development and evaluation for the Solanaceae Coordinated Agricultural project. Examples may be found at http://pbgworks.org/ and http://www.extension.org/plant_breeding_genomics. The position will also provide opportunities to participate in the analysis of large SNP datasets and integration of SNP data with trait data through genetic mapping, association analysis and genome-wide selection models. It is expected that the data analysis will become integrated with the educational content by providing sample data and scripts for webinars and tutorials. Funding is available for one year with the possibility of renewal. The position requires a Master's degree in a plant breeding, plant genetics or related field; and experience in program planning and administration. A PhD with teaching experience; experience with DRUPAL based or other social networking systems for fostering collaborative content development is desired.

Application instructions: Send via email: 1) cv, 2) the names and email addresses of three potential references, and 3) a short statement addressing interests, future goals and reason for applying to the position. Send application to: francis.77@osu.edu with "Program Manager Position" in the subject heading. Review of applicants will continue until a suitable candidate is found.

POST-DOCTORAL POSITION IN TOMATO GENETICS AND GENOMICS

Domesticated plants differ dramatically from their wild relatives in form and function. Insights into the molecular bases of this diversity improve our understanding of the domestication process and the genes that were selected to outperform their progenitors. The identification of domestication genes also offers opportunities to investigate their role in plant growth and development and how changes in protein sequence or gene expression patterns leads to different plant forms. A post-doctoral position is available to positionally clone several tomato genes regulating fruit shape and size. Owing in part to the publicly available tomato genome sequence, next generation sequencing and genotyping technologies allow researchers to clone domestication genes in rapid fashion. The successful candidate will have experience in one or more areas: quantitative and population genetics, statistics, plant breeding, and/or molecular biology. Candidates with a strong record of scholastic achievements and productivity are particularly encouraged to apply. Salaries and benefits are commensurate with OSU guidelines. Excellent laboratory and greenhouse facilities are available, as well as a service facility that is dedicated to microscopy, gene expression and high-throughput genotyping experiments (http://oardc.osu.edu/mcic). For more information go to: http://www.oardc.ohio-state.edu/.

References: Xiao et al. (2008) *Science*, 319:1527-1530; Rodriguez et al. (2011) *Plant Physiol, 156:275-285;* Huang and van der Knaap (2011) *Theor Appl Genet,* 123:465-474; Wu et al. (2011) *Plant Physiol, 157:1175-1186;* Zhang et al. (2012) *Theor Appl Genet*, DOI: 10.1007/s00122-012-1832-8.

Application instructions: Send via email: 1) cv, 2) the names and email addresses of three potential references, and 3) a short statement addressing research interest, future goals and reason for applying to the position. Send applications to: vanderknaap.1@osu.edu and "post doctoral position" in the subject heading. Review of applicants will continue until a suitable candidate is found.

Publications

Atamian HS, Eulgem T, Kaloshian I (2012) *SlWRKY70* is required for *Mi-1*-mediated resistance to aphids and nematodes in tomato. Planta 235:299-309.

de Jonge R, van Esse HP, Maruthachalam K, Bolton MD, Santhanam P, Saber MK, Zhang Z, Usami T, Lievens B, Subbarao KV, Thomma BPHJ (2012) Tomato immune receptor Ve1 recognizes effector of multiple fungal pathogens uncovered by genome and RNA sequencing. PNAS 109:5110-5115.

Fatima T, Teasdale JR, Bunce J, Mattoo AK (2012) Tomato response to legume cover crop and nitrogen: Differing enhancement patterns of fruit yield, photosynthesis, and gene expression. Functional Plant Biol 39:246–254.

Gonzales-Vigil E, Hufnagel DE, Kim J, Last RL, Barry CS (2012) Evolution of TPS20-related terpene synthases influences chemical diversity in the glandular trichomes of the wild tomato relative *Solanum habrochaites.* Plant J, doi: 10.1111/j.1365-313X.2012.05040.x.

Goyal RK, Kumar V, Shukla V, Mattoo R, Liu Y, Chung SH, Giovannoni JJ, Mattoo AK (2012) Features of a unique cluster of class I small heat shock protein genes in tandem with box C/D snoRNA genes localized on chromosome 6 in tomato. Planta 235:453-471.

Guyot R, Lefebvre-Pautigny F, Dubreuil-Tranchant C, Rigoreau M, Hamon P, Thierry Leroy T, Hamon S, Poncet V, Crouzillat D, de Kochko A (2012) Ancestral synteny shared between distantly-related plant species from the asterid (*Coffea canephora* and *Solanum sp.*) and rosid (*Vitis vinifera*) clades. BMC Genomics 13:103.

Hamilton JP, Sim SC, Stoffel K, Van Deynze A, Buell CR, Francis DM (2012) Single nucleotide polymorphism discovery in cultivated tomato via sequencing by synthesis. Plant Genome 5:17-29.

Lee JM, Joung JG, McQuinn R, Chung MY, Fei Z, Tieman DM, Klee HJ, Giovannoni J (2012) Combined transcriptome, genetic diversity and metabolite profiling in tomato fruit reveals the ethylene response factor *SlERF6* to play an important role in ripening and carotenoid accumulation. Plant J 70:191-204.

Li F, Orban R, Baker B (2012) SoMART, a web server for plant miRNA, tasiRNA and target gene analysis. Plant J 70:891-901.

Li F, Pignatta D, Bendix C, Brunkard JO, Cohn MM, Tung J, Sun H, Kumar P, Baker B (2012) MicroRNA regulation of plant innate immune receptors. PNAS 109:1790-1795.

Nambessan S, AbuQamar S, Laluk K, Mattoo AK, Mickelbart MV, Ferruzzi M., Mengiste T, Handa AK (2012) Polyamines attenuate ethylene-mediated defense responses to abrogate resistance to *Botrytis cinerea* in tomato. Plant Physiol 158:1034-1045.

Nellikunnumal SM, Chandrashekar A (2012) Computational Identification of Conserved MicroRNA and their Targets in *Coffea canephora* by EST Analysis. (Ed) Genes, Genomes and Genomics, accepted.

Pattison RJ, Catala C (2012) Evaluating auxin distribution in tomato (*Solanum lycopersicum*) through an analysis of the *PIN* and *AUX/LAX* gene families. Plant J 70:585-598.

Payyavula RS, Navarre DA, Kuhl JC, Pantoja A, Pillai S (2012) Differential effects of environment on potato phenylpropanoid and carotenoid expression. BMC Plant Biology 12:39.

Peters SA, Bargsten JW, Szinay D, van de Belt J, Visser RGF, Bai Y, de Jong H (2012) Structural homology in *Solanaceae*: analysis of genomic regions in support of synteny studies in tomato, potato and pepper. Plant J, doi:10.1111/j.1365-313X.2012.05012.x.

Salvioli A, Zouari I, Chalot M, Bonfante P (2012) The arbuscular mycorrhizal status has an impact on the transcriptome profile and amino acid composition of tomato fruit. BMC Plant Biology 12:44.

Zhou J, Reddy S, Zhou S, Sauvé RJ, Bhatti S, Fish T, Thannhauser TW (2012) Effect of heat stress on leaf proteome and enzyme activity in *Solanum chilense*. Plant Stress 6:8-13.

Zhou S, Sauvé RJ, Liu Z, Reddy S, Bhatti S, Hucko SD, Fish T, Thannhauser TW (2011) Identification of salt-induced changes in leaf and root proteomes of the wild tomato, *Solanum chilense*. JASHS 136:288-302.

Zhou S, Sauvé RJ, Liu Z, Reddy S, Bhatti S, Hucko SD, Yong Y, Fish T, Thannhauser TW (2011) Heat-induced proteome changes in tomato leaves. JASHS 136:219-226.

Conferences and Workshops

Gordon Research Conference – Plant Senescence
July 9 - 13, 2012
Stonehill College
Easton, Massachusetts, USA
http://www.grc.org/programs.aspx?year=2012&program=plantsen

National Association of Plant Breeders
Sustaining Life through Plant Improvement
August 6 - 8, 2012
Indianapolis, Indiana, USA
http://www. http://pbgworks.org/node/1360

The Potato Association of America
August 12 - 16, 2012
Denver, Colorado, USA
http://www.paa2012.colostate.edu/

SOL 2012 The 9th Solanaceae Conference
August 26 - 30, 2012
Neuchatel, Switzerland
http://www2.unine.ch/sol2012/page-3091.html

21st International Pepper Conference
November 4 - 6, 2012
Naples, Florida, USA
http://www.conference.ifas.ufl.edu/pepper2012/

ASIC 2012
24th International Conference on Coffee Science
November 11 - 16, 2012
San José, Costa Rica
http://www.asic2012costarica.org/

EUCARPIA: Capsicum and Eggplant Working Group Meeting
September 2 - 4, 2013
University of Turin, Turin, Italy
http://e20.unito.it/XVth_EUCARPIA/

Tomato Breeder's Roundtable
February 6 - 8, 2013
Chiang Mai, Thailand
http://www.tbrt2013.com/

Plant Breeding Academies

Plant Breeding Academy at University of California, Davis
September 10 - 15, 2012
February 4 - 9, 2013
June 3 - 8, 2013
http://pba.ucdavis.edu/Programs/PBA_in_Davis_Class_IV/

Plant Breeding Academy in Europe
The schedule for March 2012 to June 2013 is available at
http://pba.ucdavis.edu/PBA_in_Europe/PBA_in_Europe_Class_II/

The Asian Plant Breeding Academy
November 26 - December 1, 2012
Chiang Mai, Thailand
http://pba.ucdavis.edu/PBA_in_Asia/Asian_Plant_Breeding_Academy_Class_I/

Plant Breeding Academy in Africa
For information, visit
http://pba.ucdavis.edu/PBA_in_Africa/

Solanaceae Recipes

Grilled Pepper Salad

http://www.eatingwell.com/recipes/grilled_pepper_salad.html

Toss a colorful mix of grilled bell peppers with briny olives, sweet sun-dried tomatoes and balsamic vinaigrette for a lovely side dish. Or spread crostini with goat cheese and top it with this salad for an easy summer appetizer.
4 servings about 1 cup each; active time: 20 minutes; total time: 20 minutes.

Ingredients

4 bell peppers, (mixed colors), halved, seeded and stemmed
1/4 cup halved and pitted oil-cured black olives
1/4 cup rinsed and chopped oil-packed sun-dried tomatoes
1 tablespoon extra-virgin olive oil
1 tablespoon balsamic vinegar
1/8 teaspoon salt

Directions

- Grill peppers on medium-high, turning once, until soft and charred in spots, about 5 minutes per side. When cool enough to handle, chop the peppers; toss with olives, sun-dried tomatoes, oil, vinegar and salt in a large bowl.

- **Make Ahead Tip**: Cover and refrigerate for up to 3 days.

Nutrition, per serving: 107 calories; 7 g fat (1 g sat , 3 g mono); 0 mg cholesterol; 10 g carbohydrates; 0 g added sugars; 1 g protein; 2 g fiber; 330 mg sodium; 331 mg potassium.

Tomato Phyllo Tart

http://www.eatingwell.com/recipes/tomato_phyllo_tart.html

This colorful tomato tart will surely impress friends; no one has to know how quickly it comes together. Basil adds a fragrant finishing touch.
12 servings; active time: 30 minutes; total time: 1 hour 20 minutes

Ingredients

12 14x18 inch or 24 9x14 inch sheets phyllo dough
¼ cup extra-virgin olive oil
1 tablespoon plain dry breadcrumbs
2 tablespoons prepared pesto
¾ cup crumbled feta cheese (about 4 ounces)
1 large red tomato, cut into ¼ inch slices
1 large yellow tomato, cut into ¼ inch slices
½ teaspoons kosher salt, or to taste
Freshly ground pepper, to taste
10 - 12 small basil leaves

Directions

- Preheat oven to 400°F. Line a 17 1/2-by-12 1/2-inch baking sheet with parchment paper. Lay one large sheet of phyllo on the prepared pan. (If using the smaller size, slightly overlap two sheets on the pan to form a rectangle.) Keep the remaining phyllo covered with plastic wrap or wax paper and a damp kitchen towel.
- Lightly coat the phyllo surface with oil using a pastry brush. Sprinkle with 1/4 teaspoon breadcrumbs. Repeat this step, layering the remaining phyllo on top. Brush the final sheet with oil. Carefully roll about 3/4 inch of each side toward the center to form the outer rim of the tart.
- Using the same brush, paint pesto evenly on the surface of the tart. Sprinkle about half of the crumbled feta cheese over the pesto layer. Arrange tomato slices, alternating colors, over the pesto layer; season with salt and pepper. Sprinkle the remaining cheese over the top.
- Bake the tart until the crust turns brown and crispy, 30 to 35 minutes. Let cool in the pan on a wire rack for 5 minutes.
- To serve, lift the parchment paper and slide the tart onto a cutting board or large platter. Scatter basil leaves on top. Serve warm or at room temperature.

- **Make Ahead Tip**: Bake the tart up to 8 hours in advance; cover and refrigerate. Transport it directly on the baking sheet. Pack basil leaves separately in a plastic bag. Reheat the tart at 350Â° for 10 to 15 minutes, or until warmed through.
- Thaw frozen phyllo in the refrigerator for at least 8 hours or overnight before preparing the recipe.

Nutrition, per serving: 145 calories; 9 g fat (3 g sat , 5 g mono); 9 mg cholesterol; 12 g carbohydrates; 4 g protein; 1 g fiber; 304 mg sodium; 110 mg potassium.