XIX EUCARPIA Meeting of the Tomato Working Group

May 2-4, 2018

***Centro Congressi Partenope* - Naples, Italy**

Programme and Abstracts

EUCARPIA TOMATO NAPLES 2018

EUCARPIA

DIPARTIMENTO DI AGRARIA

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CNR - IBBR
National Research Council of Italy (CNR)
Institute of Biosciences and BioResources (IBBR)

UNINA - DIA
University of Naples Federico II (UNINA)
Department of Agricoltural Sciences (DIA)
Divisione of Plant Genetics and Biotecnology

EUCARPIA

Under the auspices of

the EUCARPIA Vegetables Section

EUCARPIA TOMATO
NAPLES 2018

XIX EUCARPIA Meeting of the Tomato Working Group

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Centro Congressi Partenope

Naples, Italy

Local Organizing Committee

- Silvana Grandillo (CNR)
- Stefania Grillo (CNR)
- Maria Cammareri (CNR)
- Luigi Frusciante (UNINA)
- Amalia Barone (UNINA)
- Maria Raffaella Ercolano (UNINA)

Scientific Committee

- Yuling Bai (WUR, The Netherlands)
- Mathilde Causse (INRA, France)
- Maria Raffaella Ercolano (UNINA, Italy)
- Silvana Grandillo (CNR, Italy)
- Antonio Granell (CSIC, Spain)
- Matteo Lorito (UNINA, Italy)
- Pierdomenico Perata (SSSUP, Italy)
- Dani Zamir (HUJI, Israel)

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Technical and Organizing Secretariat

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Gaetano Guarino (CNR - IBBR)

SCIENTIFIC AND SOCIAL PROGRAMME

Location: *Centro Congressi Partenope* -University of Naples Federico II,
Via Partenope 36, Naples, Italy

WEDNESDAY, MAY 2

08:30 Registration and Poster set up
09:30 Opening remarks

SESSION I:
GENETIC AND GENOMIC RESOURCES

Chairpersons: Dani Zamir (HUJI, Israel); Silvana Grandillo (CNR-IBBR, Italy)

09:45 **Invited lecture**: *Dani Zamir*
Wild germplasm for breaking yield barriers

10:15 *Irina T Balashova, SM Sirota, EG Kozar, EV Pinchiuk*
Marker mutant collection for heritability analysis of main tomato traits

10:35 *Silvia Gianoglio, C Comino, A Acquadro, A Moglia, F Blasio, S Lanteri, D Orzaez, A Granell*
Generation of tomato chlorophyll-retaining *gf1* mutants using the CRISPR/Cas9 GoldenBraid toolkit

10:55 *Coffee Break*

11:20 *Lukas P Haliński, A Topolewska, P Stepnowski*
Chemotaxonomic approach to the classification of wild and cultivated tomato species: a new look at *Solanum pennellii* Corr.

11:40 *Raana Roohanitaziani, M Lammers, J Molthoff, Y Tikunov, B Rashidi, FM Dekens, R de Maagd, R Finkers, R Visser, A Bovy*
Evaluation of a sequenced tomato core collection for post-harvest shelf-life

12:00 *Martin W Ganal, A Polley, J Plieske, E-M Graner*
A new tomato SNP array for high-resolution genotyping

12:20 *C Colantuono, G Diretto, M Rodriguez, F Alvarez-Valin, Maria Luisa Chiusano*
From genes to their compositional context: a deeper browsing throughout the tomato genome sequences

12:40 *Lunch*

SESSION II:
GENOMICS AND BREEDING APPROACHES TO IMPROVE FRUIT QUALITY

Chairpersons: Antonio Granell (CSIC, Spain); Amalia Barone (UNINA, Italy)

13:40 **Invited lecture**: *Antonio Granell*
Tomato as a model for fleshy fruit quality: genomics and breeding approaches to improve organoleptic and nutritional fruit composition

14:10 *Mondher Bouzayen, J Pirrello, M Zouine, C Chervin, J-H Shin*
The network of hormone signaling underlying fruit ripening: allies and opponents

14:30 *S Colanero, Silvia Gonzali, P Perata*
The *atroviolacea* gene encodes a R3-MYB protein repressing anthocyanin synthesis in tomato plants

14:50 *Gianfranco Diretto, S Frusciante, C Fabbri, N Schauer, L Busta, Z Wang, AJ Matas, A Fiore, JKC Rose, AR Fernie, R Jetter, B Mattei, JJ Giovannoni, G Giuliano*
Modification of β-carotene levels reveals a carotenoid/ABA regulatory loop in tomato fruit ripening

15:10 *Wim H Vriezen, P Wesselink*
Fine-tuning gene functions: lessons from tomato mutants

15:30 *Coffee Break*

16:00 **Invited lecture**: *Pierdomenico Perata*
High anthocyanin tomatoes: biology, breeding, biotechnology

16:30 *Baowen Huang, J-M Routaboul, G Hu, W Deng, M Liu, M Zouine, E Maza, Z Li, B van der Rest, M Bouzayen*
Tomato class-D MADS-box genes control fruit development and fleshy tissue differentiation

16:50 *M Manuela Rigano, R Calafiore, A Aliberti, A Raiola, V D'Amelia, D Bellincampi, V Lionetti, A Barone*
Identification and exploitation of wild alleles controlling ascorbic acid and carotenoids accumulation in tomato fruit

17:10 *Julia Hagenguth, L Kanski, H Kahle, A Persch, I Smit, HC Becker, B Horneburg*
The potential of a breeders' sensory test in the F2 generation of tomato

17:30 *Valerio Primomo, D Liscombe, T Banks, A Bowen*
Consumer preference-driven development of tastier tomatoes-on-the-vine

17:50 *Aurelia Scarano, E Butelli, S De Santis, E Cavalcanti, L Hill, M De Angelis, G Giovinazzo, M Chieppa, C Martin, A Santino*
A combination of dietary anthocyanins, flavonols and stilbenoids alleviates the symptoms of inflammatory bowel disease in mice

18:10 – 19:45 ROUND TABLE:
FUTURE CHALLENGES FOR TOMATO CROP BREEDING
Moderator: Dani Zamir (HUJI, Israel)

20:45 *Pizza party*

THURSDAY, MAY 3

SESSION III:
BREEDING STRATEGIES FOR SUSTAINABLE AGRICULTURE-ABIOTIC STRESSES

Chairpersons: *Mathilde Causse (INRA, France); Stefania Grillo (CNR-IBBR, Italy)*

09:00 **Invited lecture**: *Mathilde Causse*
Genotype by environment interaction in tomato grown under several abiotic stresses and the genetic basis of plasticity

09:30 *Ivo Rieu*
The genetics and physiology of pollen thermo(in)tolerance

09:50 *M De Palma, M Salzano, C Villano, R Aversano, T Docimo, M Lorito, M Ruocco, N D'Agostino, Marina Tucci*
Transcriptome profiling of tomato colonized by beneficial fungi of the genus *Trichoderma*: lessons from below

10:10 *D Ronga, F Caradonia, M Buti, J Milc, L Arru, C Leonarduzzi, D Hagassou, L Setti, L Laviano, F Badeck, F Rizza, V Terzi, M Beretta, N Pecchioni, Enrico Francia*
Integrated approaches to increase tomato adaptation to Italian growing conditions

10:30 *Coffee Break and* ***Poster Session***

12:00 *G Ntatsi, D Savvas, V Papasotiropoulos, A Katsileros, R Zrenner, DK Hincha, E Zuther, Dietmar Schwarz*
Transcriptomic responses of grafted tomato are affected by sub-optimal temperature in the root environment

12:20 *MJ Gonzalo, I Najera, D Gil, C Bauxali, A Granell, Antonio J Monforte*
Heat tolerance in tomato germplasm and dissection of the genetic control

12:40 *Lunch*

13:30 - 19:00 Technical visit

20:30 **Social dinner**

FRIDAY, MAY 4

SESSION IV:
BREEDING STRATEGIES FOR SUSTAINABLE AGRICULTURE – BIOTIC STRESSES

Chairpersons: Yuling Bai (WUR, The Netherlands); Maria Raffaella Ercolano (UNINA, Italy)

08:30 **Invited lecture:** *Yuling Bai*
Impact of abiotic stresses on tomato resistances to pathogens

09:00 *MR Figàs, B Mantilla, J Prohens, E Rosa, Salvador Soler*
Screening for tolerance to *Tomato leaf curl New Delhi virus* (*ToLCNDV*) in tomato germplasm by whitefly inoculation

09:20 *Giuseppe Andolfo, A Di Donato, MR Ercolano*
Innovative approaches to modify the innate immunity system in tomato

09:40 *Lliana Stamova, H Doan, M Davis*
Screening tomato genetic materials for resistance to a new California isolate of *Fusarium oxysporum* f.sp. *lycopersici*

10:00 *Mas Muniroh Mohd Nadzir, E Koseoglou, M Appiano, JC Rivas Baeza, AW Heusden, Y Bai*
Utilizing susceptibility (S) genes against *Clavibacter michiganensis* subsp. *michiganensis* in tomato

10:20 *Coffee Break*

SESSION V:
HOLISTIC APPROACHES TO ENHANCE PLANT AND SEED PRODUCTION

Chairpersons: Pierdomenico Perata (SSSA, Italy), Matteo Lorito (UNINA, Italy)

11:00 **Invited lecure:** *Matteo Lorito*
New bio-inspired treatments to enhance plant and seed production

11:30 *Antonietta Santaniello, G Povero, A Petrozza, D Di Tommaso, A Piaggesi, P Perata*
Phenomic and molecular approaches to investigate the effects of biostimulant products on tomato plants under drought stress conditions

11:50 *Andrea Schubert, F Cardinale, M Macchio, A Caracci, I Visentin*
Synthetic strigolactones affect floral induction in tomato

12:10 *Vipen K Sawhney, IS Sheoran, V Omidvar, M Fellner, A Pucci, A Mazzucato*
A photoperiod-sensitive male-sterile mutant in tomato: physiological, developmental, genetic, and molecular mechanisms, and its use in hybrid seed industry

12:30 *Michael J Van Oosten, E Di Stasio, V Cirillo, S Silletti, V Ventorino, O Pepe, G Raimondi, A Maggio*
Improving salt stress adaptation and nutrient use efficiency in tomato plants through root inoculation with the stress tolerant *Azotobacter chroococcum* 76A

12:50 *Lunch*

14:00 **PRESENTATION & DISCUSSION OF H2020 PROJECTS (TRADITOM, TomGEM, TomRES)**

Chairpersons: Antonio Granell (CSIC-UPV, Spain)
Mondher Bouzayen (ENSAT, France)
Andrea Schubert (UNITO, Italy)

15:15 Closing remarks

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Synthetic strigolactones affect floral induction in tomato

Schubert A[1], Cardinale F[1], Macchio M[2], Caracci A[1], Visentin I[1,2]

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Strigolactones (SLs) are phytohormones acting as ecological communicators with (micro)organisms in the rhizosphere, and involved in the responses to abiotic stresses such as drought and nutrient deprivation. As developmental regulators, they inhibit shoot branching and modulate root morphology, but also promote shoot secondary growth. The morphology of SL-depleted or insensitive plants therefore is altered, typically stunted and bushy. These mutants also vegetate longer than the wild type and, in some species such as tomato (*Solanum lycopersicum* L), they are severely delayed in reproductive transition. This latter aspect, which is not as obvious in all species for which SL mutants are available, leads to a reduced number of flowers, fruits, and seeds. Nothing is known at present on possible reproductive phenotypes caused by an excess of strigolactones instead, as no over-producing lines of any species are available. We therefore became interested in the possible effects of exogenous strigolactone treatments on floral induction in tomato. To investigate this point, plants of tomato cv M82 grown under greenhouse conditions in the summer of 2016 and 2017 were sprayed twice during the vegetative phase (4 and 5 weeks after sowing) with either 5 M or 0.1 M solutions of *rac*-GR24, a synthetic strigolactone analogue. Treated plants anticipated flowering by about one week compared to mock-treated plants; weighed scoring of flower stages and visual observation of flower morphology indicates that floral differentiation progressed normally afterwards. Preliminary yield data indicate that treatments lead to earlier harvestable fruits, and that the cumulative yield at the end of the growing season is higher for GR24-treated plants. We are currently investigating the molecular underpinnings of such effect, by NGS and targeted transcript quantification for genes involved in floral induction in tomato. "This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement n. 727929 - TOMRES"