

19TH INTERNATIONAL SUNFLOWER CONFERENCE



isc 2016

29 MAY – 3 JUNE, 2016

EDİRNE, TURKEY





ISC 2016



**PROCEEDINGS
OF
19TH INTERNATIONAL SUNFLOWER
CONFERENCE**

29 MAY – 3 JUNE, 2016

EDİRNE, TURKEY

**19TH INTERNATIONAL SUNFLOWER
CONFERENCE**

**29 MAY – 3 JUNE, 2016,
EDIRNE, TURKEY**

In

**Trakya University Balkan Congress Center,
Edirne, Turkey**

Organized by

Trakya University

and

International Sunflower Association

WELCOME from the CHAIR

You are welcome to our conference that will be jointly organized by Trakya University and International Sunflower Association. The aim of our conference is to present scientific subjects of a broad interest to the sunflower community, by providing an opportunity to present their work as oral or poster presentations that can be of great value for global sunflower production and trade. Our goal is to bring three communities, namely science, research, and private investment together in a friendly environment of Edirne, Turkey in order to share their interests and ideas and to benefit from the interaction with each other.

Our Conference held with record participation with over 600 people working on sunflower as researchers, scientists from seed companies, from oil industry and machinery coming from all part of the World. We have 300 papers which is a record number and almost doubles the previous meetings.

Due to many inquiries about combining our activities with oil industries in ISC 2016, International Sunflower Oil Quality Symposium are organized as one day as a side event during the conference. Sunflower farmers and growers will join also to our conference, so it will be also interesting as an initial attempt to bring together triangle dimensions as scientist, growers and industry in our conference.

Conference activities;

Plenary sessions with oral and poster presentations are on 30th, 31st of May and 1st of June 2016. Besides, the field day and the Sightseeing tours are on June 2nd – 3rd June 2016.

Agriculture is an important sector feeding all humankind, but it needs new developments and technologies to supply enough food for increasing world population year by year. Turkey is one of the most important contries on sunflower production and trade and an example to the leading agricultural economies in the world. Therefore, we hope that this conference will help to solve the problems encountered in the Sunflower community with establishing good network collaborations, joint projects and better relationships among countries with sharing our knowledge and experience together. We wish success to this meeting and hope a great scientific achievement together with your contributions.

Edirne is not only a very nice, lovely and historical city at the edge of Europe, but located just at the heart of Balkan region and history endowed with monuments reminding imperial past. We are much pleased to host you all in Edirne and in Turkey.

We would like to thank you to join this conference and we would like to give also special thanks our sponsors and collaborators for giving us big supports to organize this event.

We wish you nice stay in Edirne for truly rewarding days.

Assoc Prof Dr Yalcin KAYA

Head of Organizing Committee

President of International Sunflower Association

ORGANIZING COMMITTEE

LOCAL ORGANIZING COMMITTEE

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| Dr. Laura MAREK | USDA-ARS Ames, Iowa | USA | Genetic Resources |
| Dr. Janet KNODEL | North Dakota State Univ. | USA | Sunflower Insects |

INVITED SPEAKERS of ISC 2016

SESSIONS

Breeding
Molecular Breeding
Agronomy and Seed Production
Genetic Resources
Disease & Pest resistance and Management
Orobanche Resistance and Management
Abiotic Stress Tolerance and Management
Herbicide Resistance and Management
Confectionery

SPEAKER

Dr Branislav DOZET (Hungary)
Dr. Lili QI (USA)
Dr Philippe DEBAEKE (France)
Dr Laura MAREK (USA)
Prof Dr Steven MASIREVIC (Serbia)
Dr Maria JOITA-PACUREANU (Romania)
Dr Nicolas LANGLADE (France)
Dr Goran MALIDZA (Serbia)
Dr Nada HLADNI (Serbia)

INVITED SPEAKERS of INTERNATIONAL SUNFLOWER OIL QUALITY SYMPOSIUM

| NAME | INSTITUTION | COUNTRY |
|---------------------------|----------------------|----------------|
| Prof Dr Nurhan T. DUNFORD | Oklahoma State Univ. | USA |
| Fabrice THURON | Fat & Associates, | FRANCE |
| Dr Leanordo VELASCO | CSIC, Cordoba, | SPAIN |

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Assoc Prof Dr Yalcin KAYA, Assoc Prof Dr Semra HASANCEBI

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QUALITY SYMPOSIUM**

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| Prof. Dr Beraat OZCELIK | Istanbul Technical Univ., Turkey |
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| Suat OZTURK | TYSD, Turkey |



19TH INTERNATIONAL SUNFLOWER CONFERENCE
29 MAY – 3 JUNE, 2016
EDIRNE, TURKEY

CONFERENCE PROGRAM

GENERAL SESSION

| SUNDAY, MAY 29th, 2016 | |
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| 14 ⁰⁰ - 20 ³⁰ | Registration at Hotels and Balkan Congress Center |
| MONDAY, MAY 30th, 2016 | |
| 08 ³⁰ - 09 ³⁰ | Registration at Balkan Congress Center |
| 09 ³⁰ - 10 ³⁰ | Opening Ceremony Balkan Synphony Orchestra Slide Show: Sunflower from Soil to Table:Our Yellow Bride in the fields Giving Appreciation Certificates to our Sponsors |
| 10 ³⁰ – 11 ⁰⁰ | Coffee break |
| 11 ⁰⁰ - 12 ³⁰ | OPENING SESSION: Session Chair: PROF DR MARIA DUCA – Rector of University of Moldova Academy of Science |
| 11 ⁰⁰ – 11 ⁴⁰ | Invited Speaker Prof Dr. Dragan Skoric “HISTORY OF SUNFLOWER BREEDING IN THE WORLD” |
| 11 ⁴⁰ – 12 ²⁰ | Invited Speaker Dr. Lili Qi “MOLECULAR MAPPING OF THE DISEASE RESISTANCE GENES AND ITS IMPACT ON SUNFLOWER BREEDING” |
| 12 ²⁰ – 12 ³⁰ | DISCUSSION |
| 12 ³⁰ – 13 ³⁰ | LUNCH ((Courtesy of Nidera Semillas) |

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| | GENETIC AND BREEDING | BIOTIC AND ABIOTIC STRESS TOLERANCE | CROP PRODUCTION AND MANAGEMENT | MOLECULAR GENETICS |
|------------------------------------|--|--|---|--|
| | (Main Meeting Room) | (2 nd Floor Senate Meeting Room) | (2 nd Floor Left Meeting Room) | (2 nd Floor Right Meeting Room) |
| | 30.05.2016 MONDAY | 30.05.2016 MONDAY | 30.05.2016 MONDAY | 30.05.2016 MONDAY |
| 13 ³⁰ -15 ³⁰ | <i>1st Session Chair: CARLOS FEOLI</i> | <i>1st Session Chair: DR MARIA JOITA- PACUREANU</i> | <i>1st Session Chair: DR VALENTINA ENCHEVA</i> | <i>1st Session Chair: DR RENATE HORN</i> |
| 13 ³⁰ -13 ⁵⁰ | Invited Speaker DR BRANISLAV DOZET | The genetics and evolution of solar tracking – B. BLACKMAN, S. HARMER | Use of polymer hydrogel in soil moisture conservation for sunflower cultivation in rainfed situations of Northern Karnataka, India: A case study – U. SHANWAD, B. CHITTAPUR, SHANKERGOUD I, B. DESAI, GOVINDAPPA MR., V. KULKARNI | The cultivated sunflower pan genome provides insights on the wild sources of introgressions and their role in breeding – S. HUBNER, E. ZIGLER, J.R. MANDEL, D. SWANEVELDER, P. VINCOURT, N. LANGLADE, J. M. BURKE, L. H. RIESEBERG |
| 13 ⁵⁰ -14 ¹⁰ | Contemporary Challenges in Sunflower Breeding | Impact of exogenously applied glycine betaine on physiological attributes of sunflower under drought stress- NOSHIN I., NADIA Z., N. BATOOL, Q. BANO | Determination of the yield and yield components performance of some sunflowers (<i>Helianthus annuus</i> L.) under rainfed conditions – I. DEMIR | Principal Component Analysis for Carbon Isotope Discrimination-Related Traits in Recombinant Inbred Lines of Sunflower – A. L. ADIREDDO, T. LAMAZE, P. GRIEU |
| 14 ¹⁰ -14 ³⁰ | Genetic analysis of seed yield related traits under optimum and limited irrigation in sunflower – M. GHAFARI | Rapid invitro screening of sunflower genotypes for moisture stress tolerance using PEG 6000 - SHANKERGOUD I., SHESHAIAH K. C. | Appropriate nitrogen (N) and phosphorus (P) fertilizer regime for sunflower (<i>Helianthus annuus</i> L.) in the humid tropics – E. AKPOJOTOR, V. OLOWE | Molecular Studies of Sunflower Responses to Abiotic Stresses – I. TINDAS, R. I. AYTEKIN, S. ÇALIŞKAN |
| 14 ³⁰ -14 ⁵⁰ | Breeding for sunflower hybrids adapted to climate change: the SUNRISE collaborative and multi-disciplinary Project - LUBRANO-LAVADERA A.S., M. COQUE, MUNOS S., DEBAEKE P., MANGIN B., GOUZY J., KEPHALIACOS C., PIQUEMAL J., PINOCHET X., | Exploring drought tolerance related traits in <i>Helianthus argophyllus</i> , <i>Helianthus annuus</i> and their hybrids – M. MUBASHAR HUSSAIN, M. KAUSAR, M. KHAN, P. MONNEVEUX | Interactive Effects of Different Intra-Row spacing and Nitrogen Levels on Yield and Yield Components of confectionery sunflower (<i>Helianthus annuus</i> L.) genotype (Alaca) Under Ankara conditions – S. DAY, O. KOLSARICI | Comparative assessment of androgenic response in sunflower (<i>Helianthus annuus</i>) – N. AKGUL, E. ÇABUK ŞAHİN, Y. AYDIN, A. ALTINKUT UNCUOĞLU, G. EVCI, A GÜREL |

19th International Sunflower Conference, Edirne, Turkey, 2016

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| | LANGLADE N. | | | |
| 14 ⁵⁰ -15 ⁰⁰ | Discussion | Discussion | Discussion | Discussion |
| 15 ⁰⁰ -15 ³⁰ | Coffee break | Coffee break | Coffee break | Coffee break |
| 15 ³⁰ -17 ⁰⁰ | 2nd Session: Chair: DR VLADIMIR MIKLIC | 2nd Session: Chair: DR FELICITY VEAR | 2nd Session Chair: PROF DR GIAN PAOLO VANNOZZI | 2nd Session Chair: DR PHILIPPE DEBAEKE |
| 15 ³⁰ -15 ⁵⁰ | Assessment of sunflower germplasm selected for cold tolerance under autumn planting conditions in Morocco - HOUMANAT K., MAZOUZ H., EL FECHTALI M., NABLOUSSI A. | Invited Speaker PROF DR STEVAN MAŠIREVIĆ | Global change adaptation: what future for sunflower crops and products? A foresight study for oilseed chains at 2030 horizon – E. PILORGE, A. M. TREMBLAY, F. MUEL | Molecular and genetic aspects of sunflower defensive response to downy mildew - T. ŞESTACOVA, A.PORT, M. DUCA |
| 15 ⁵⁰ -16 ¹⁰ | Perspective and challenges to develop high yielding, disease resistant and oil quality sunflower hybrids in India - R.K.SHEORAN | | Sunflower diseases research progress and management | Bioactivity and Phytochemical Evaluation of Sunflower (<i>Helianthus annuus</i> L.) Leaf Extract – Y. BIBI, A. QAYYUM, S. NISA |
| 16 ¹⁰ -16 ³⁰ | Stability performance of new introduced sunflower hybrids for seed yield and its components under Sudan conditions – A. A. M. ABDALLA | Control of Verticillium dahliae causing sunflower wilt using Brassica green manures - DESSERRE D., MESTRIES E., DECHAMP-GUILLAUME G., SEASSAU C. | Effects of Different Organomineral and Inorganic Compound Fertilizers on Seed Yield and Some Yield Components of Sunflower (<i>H. annuus</i> L.) – S. SUZER, E. CULHACI | Molecular Studies involved in sunflower responses in drought stress - I. ALTINDAS, E. AKSOY, S. CALISKAN |
| 16 ³⁰ 16 ⁴⁵ | Discussion | Discussion | Discussion | Discussion |
| 16 ⁴⁵ -18 ⁰⁰ | Poster Session | Poster Session | Poster Session | Poster Session |
| 19 ³⁰ - | Dinner Party (Courtesy of Syngenta) | Dinner Party (Courtesy of Syngenta) | Dinner Party (Courtesy of Syngenta) | Dinner Party (Courtesy of Syngenta) |

| | 31.05.2016 TUESDAY | 31.05.2016 TUESDAY | 31.05.2016 TUESDAY | 31.05.2016 TUESDAY |
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| 09 ³⁰ -10 ¹⁰ | 3RD Session Chair: DR OLIVIER COTTET | 3RD Session Chair: PROF DR STEVAN MASIREVIC | 3RD Session Chair: DR AMELIA BERTERO DE ROMANO | 3RD Session Chair: DR DRAGANA MILADINOVIC |
| 09 ³⁰ -09 ⁵⁰ | Collection of wild <i>Helianthus anomalus</i> and <i>deserticola</i> sunflower from the desert southwest USA – G. SEILER, L. MAREK | Isolation and identification of pathogen of Sunflower <i>Fusarium Wilt</i> - JING G. YUAN YUAN Z., GUI Z., JIAN Z., KAI W., JUN Z. | Invited Speaker | Proteomic response of sunflower to drought stress – M. GHAFARI, M. TOORCHI, M. VALIZADEH |
| 09 ⁵⁰ -10 ¹⁰ | The b1 locus that controls apical shoot branching in <i>H. annuus</i> exhibits a molecular diversity linked to the breeding history of hybrids - DURIEZ P., BONIFACE, M. C., POUILLY N., VAUTRIN S., MAYJ., RODDE N., BERGES H., CARRERE S., GOUZY J., P. VINCOURT, J. PIQUEMAL, S. MUNOS | Distribution of <i>Plasmopara halstedii</i> pathotypes in Hungary – R. BÁN, A. KOVÁCS, G. BAGLYAS, M. PERCZEL, G. TUROCZI, K. KOROSI | DR PHILIPPE DEBAEKE | Identification of HaDELLA, HaGID1 as well as HaSLEEPY and HaSNEEZY genes involved in gibberellin signaling in sunflower - R. EWALD, N. GEHM, L. POPIOLKOWSKI, A. ANTELMANN, R. HORN |
| 10 ¹⁰ -10 ³⁰ | Phenotypic and genotypic characterization of 400 new sunflower pre-bred lines – G. BAUTE, W. ANYANGA, E. ALBRECHT, L. H. RIESEBERG | Exploitation of the knowledge on oomycete effectors to drive the discovery of durable disease resistance to downy mildew in sunflower – Y. PECRIX, L. BUENDIA, Q. GASCUEL, C. PENOUILH-SUZETTE, L. GODIARD | Chemical Broomrape (<i>Orobanche cumana</i>) control in Clearfield® sunflower with different Imazamox containing herbicide formulations – M. PFENNING, M. VALTIN, S. SASCHA, J. BESSAI | Characterization of sunflower inbred lines with high oleic acid content by DNA markers – B. B. BILGEN |
| 10 ³⁰ -10 ⁵⁰ | Developing well adapted hybrids in Europe by using a G*E approach - GAUTIER F., HELOISE H., MILAGROS G., SAUVAIRE D. | Response to sunflower (<i>Helianthus annuus</i> L.) plant at early growth stage to cadmium toxicity – Y. CIKILI, H. SAMET, N. C. ATIKMEN | Pulsar® Plus and Eurolightning® Plus - herbicides for enhanced weed control in Clearfield® Plus sunflower – J. BESSAI, SCHLÄFER S., PFENNING M., MORAN D., CARTIN J. | Evaluation of WRKY and MYB transcription factors in some downy mildew infected sunflower lines; microarray data analysis – E. FILIZ, I. I. ÖZYİĞİT, R. VATANSEVER |

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| 10 ⁵⁰ -11 ⁰⁰ | Discussion | Discussion | Discussion | Discussion |
| 11 ⁰⁰ -11 ²⁰ | Coffee break | Coffee break | Coffee break | Coffee break |
| 11 ²⁰ -12 ³⁰ | 4th Session Chair: DR SINISA JOCIC | 4th Session Chair: DR MICHAEL FOLEY | 4th Session Chair: DR SUJATHA MULPURI | 4th Session Chair: PROF DR RISHI BEHL |
| 11 ²⁰ -11 ⁴⁰ | Correlation studies between SSR marker based genetic distance and heterosis in sunflower (<i>Helianthus annuus</i> L.) – V. KULKARNI, SHANKERGOUD I., SUPRIYA S.M, SURESHA P.G. | PCR combined with GFP tagged <i>Verticillium dahliae</i> confirmed the seeds transmission of Sunflower <i>Verticillium</i> Wilt - YUAN YUAN Z., GUI Z., JIAN Z., JUN Z. | Relationships between Germination and Vigor Tests with Field Emergence of Sunflower in Iran – H. SADEGHI, S. SHEIDAEI | Invited Speaker DR STEPHANE MUNOS De novo sequencing of the <i>Helianthus annuus</i> and <i>Orobanche cumana</i> genomes |
| 11 ⁴⁰ -12 ⁰⁰ | Optimization of Agrobacterium-mediated gene transfer systems in Turkish sunflower (<i>Helianthus annuus</i> L.) varieties – I. I. ÖZYİĞİT, S. KARADENİZ, H. TOMBULOGLU, E. FILİZ | Stability of the level of partial resistance to white rot in sunflower – M. ANABELLA DINON, F. CASTAÑO, S. SAN MARTINO, J. LÚQUEZ, F. QUIROZ | Pest Monitoring and Handling System Based on 4G Mobile System – C. ATLIĞ | |
| 12 ⁰⁰ -12 ²⁰ | Inclusion of dominance effect in genomic selection model to improve predictive ability for sunflower hybrid performance – F. BONNAFOUS, N. LANGLADE, B. MANGIN | Genetic divergence among sunflower inbred lines and their convergent improvement for yield, quality and disease resistance- R. RANI - R. K. SHEORAN – S. CHANDER – R. K. BEHL | New seed treatment solutions for <i>Plasmospora</i> Resistance Management in Sunflower – F. BRANDL | Comparison of cytoplasmic male sterility based on PET1 and PET2 cytoplasm in sunflower (<i>Helianthus annuus</i> L.) - HORN R., REDDEMANN A., DRUMEVA M |
| 12 ²⁰ -12 ³⁰ | Discussion | Discussion | Discussion | Discussion |
| 13 ³⁰ -13 ³⁰ | Lunch (Courtesy of Edirne Farmer Union) | Lunch (Courtesy of Edirne Farmer Union) | Lunch (Courtesy of Edirne Farmer Union) | Lunch (Courtesy of Edirne Farmer Union) |
| 13 ³⁰ -15 ³⁰ | 5th Session Chair: DR THIERRY ANDRE | 5th Session Chair: DR ROBERT NEMETH | 5th Session Chair: PROF DR BENJAMIN BLACKMAN | 5th Session Chair: PROF DR DEJANA PANKOVIC |
| 13 ³⁰ -13 ⁵⁰ | Invited Speaker DR MARIA JOITA-PACUREANU Broomrape (<i>Orobanche cumana</i> Wallr.) - Update on racial | Cadmium-potassium interrelationships in sunflower (<i>Helianthus annuus</i> L.) – H. SAMET, Y. CIKILI, N. C. ATIKMEN | Performance of sunflower hybrids in black cotton soils of Northern Karnataka, India – U. SHANWAD, SHANKERGOUD I, S. N. SUDHAKARBABU, V. KULKARNI, GOVINDAPPA MR, VIJAYKUMAR G. | Approaches for improvement of resistance to powdery mildew in sunflower (<i>Helianthus annuus</i> L.) – S. MULPURI, K. PALCHAMY, C. R. SANKARANENI, V. KODEBOYİNA |

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| 13 ⁵⁰ -14 ₁₀ | composition and distribution, host resistance and management | Effects of Micro Nutrients (Fe, Zn, B and Mn) on Yield and Yield Components of Two Sunflower (<i>Helianthus annuus</i> L.) Cultivars in Urmia Condition – A. RAHIMI, J. JALILIAN | Modeling sunflower fungal complex to help design integrated pest management strategies - AUBERTOT J. N., MESTRIES E., M. A. VEDY-ZECCHINI, P. DEBAEKE | Genetic engineering studies on sunflower- M. E. ÇALIŞKAN, S. DAS DANGOL |
| 14 ¹⁰ -14 ₃₀ | Testing annual wild sunflower species for resistance to <i>Orobanche cumana</i> Wallr – S. TERZIĆ, B. DEDIĆ, J. ATLAGIĆ, S. JOCIĆ, D. MILADINOVIĆ, M. JOCKOVIĆ | Quantification of drought tolerance levels of sunflower inbred lines by means of <i>chlorophyll</i> -a fluorescence - A. S. BALKAN, NALCAIYI, S. CULHA ERDAL - O. GUNDUZ, V. PEKCAN, O. ARSLAN, N. CICEK, Y. KAYA, Y. EKMEKCI | Escape to tiny bug (<i>Nysius simulans</i> Stål) attack across planting date adjustment in sunflower hybrid seed crops from southern BuenosAires province, Argentine – J. RENZI, O. REINOSO, M. BRUNA, M. AVALOS, M. CANTAMUTTO | Invited Speaker DR NICOLAS LANGLADE Genome-wide association of oil yield plasticity to drought, nitrogen and chilling stresses in sunflower |
| 14 ³⁰ -14 ₅₀ | Determination of superior hybrid combinations in sunflower and testing of their resistance to broomrape (<i>Orobanche cumana</i> Wallr.) In infested areas – O. GÜNDÜZ, A. T. GOKSOY | The effect of climate factors and climate change on the yield of sunflower (<i>Helianthus annuus</i> L.) in Marmara region – H. GURKAN, H. BULUT, N. BAYRAKTAR, M. DEMIRCAN, O. ESKİOĞLU, N. KOÇAK | Current Situation, Problems and Solutions of Sunflower in the Central Anatolian Region – C. YAVUZ, S. CALISKAN | |
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| 15 ³⁰ -17 ₀₀ | 6th Session Chair: DR CHAO CHIEN JAN | 6th Session: Chair: DR GERALD SEILER | 6th Session Chair: PROF DR MICHELLE GILLEY | 6th Session Chair: DR STEPHANE MUNOS |
| 15 ³⁰ -15 ₅₀ | Invited Speaker DR GORAN MALIDZA | Effects of Naphthalene Acetic Acid and N6-Benzyladenine on Androgenesis in <i>Helianthus annuus</i> L. Anthers - S. DAYAN, H. ARDA | Microbial Dressing of Sunflower Seeds with <i>Trichoderma harzianum</i> KUEN 1585 – Y. S. YONSEL, M. SEVİM | QTL mapping for broomrape (<i>Orobanche cumana</i> Wallr.) resistance in sunflower – I. CELİK, D. ZARARSIZ, A. FRARY, S. DOGANLAR |
| 15 ⁵⁰ -16 ₁₀ | Integrated weed management in sunflower: Challenges and opportunities | Do cell wall proteins affect the setting of grains and their potential weight in sunflower? – D. CALDERINI, S. VASQUEZ, F. CASTILLO, P. | Green and brown bridges aid survival of multiple <i>Diaporthe</i> / <i>Phomopsis</i> species with a range of virulences on sunflower, soybeans, | Determination the genetic characterization of different lines of sunflower (<i>Helianthus annuus</i> L.) by using genetic resources |

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| | | MONTECINOS, A. CLAUDE, C. LIZANA, R. RIEGEL | mungbeans and other crops in Australia. – S. THOMPSON, S. NEATE, Y. PEI TAN, R. SHIVAS, E. AITKEN | based on SSRs (Simple Sequence Repeat) – D. BASALMA, M. PASHAZADEH |
| 16 ¹⁰ -16 ³⁰ | Advancements in Clearfield® Plus Sunflower Hybrid Variety Development – B. WESTON, M. PFENNING, C. NIETO, P. ANGELETTI, E. SAKIMA | The Estimating Drought Stress Tolerances of Sunflower Inbred lines under controlled environmental conditions – O. ARSLAN, A. S. BALKAN NALCAIYI, G. EVCI, V. PEKCAN, I. M. YILMAZ, S. ÇULHA ERDAL, N. CICEK, Y. KAYA, Y. EKMEKCI | Evaluation of Sunflower (<i>Helianthus annuus</i> L.) Hybrids for Photothermal Units Accumulation, Oil Yield, Oil Quality and Yield Traits under Spring Planting Conditions of Haripur, Pakistan – A. QAYYUM, I. SULTAN, S. U. KHAN, Y. BIBI, A. MEHMOOD, A. SHER, M. A. JENKS | Study of the genomic diversity of <i>Verticillium sp.</i> capable of colonizing sunflower. How knowledge of pathogen genetic structure can be combined with classical breeding approaches to guide it – H. MISSONNIER, F. LUIGI, L. GWENAELE, DAYDÉ J, J. ALBAN, THOMMA B. PHJ |
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| 16 ⁴⁵ -18 ⁰⁰ | Poster Session | Poster Session | Poster Session | Poster Session |
| 19 ³⁰ - | Dinner Party | Dinner Party | Dinner Party | Dinner Party |
| | 01. 06.2016 WEDNESDAY | 01. 06.2016 WEDNESDAY | 01. 06.2016 WEDNESDAY | 01. 06.2016 WEDNESDAY |
| 09 ³⁰ -11 ⁰⁰ | 7th Session Chair: DR MIGUEL CANTAMUTTO | REGISTRATION | | |
| 09 ³⁰ -09 ⁵⁰ | The effects of applied herbicides on yield and oil quality components of two oleic and two linoleic sunflower (<i>Helianthus annuus</i> L.) hybrids – F. ONEMLI, U. TETIK | INTERNATIONAL SUNFLOWER OIL QUALITY SYMPOSIUM Opening Ceremony | | |
| 09 ⁵⁰ -10 ¹⁰ | New virulences of <i>Orobanche cumana</i> appear in Romania - PARVU N., TEODORESCU A. | Session Chair: PROF DR MEHMET EMIN CALISKAN Invited Speaker Fabrice THURON - "HO Oilseeds and Oils Market: Positioning Sunflower Today and Tomorrow | | |
| 10 ¹⁰ -10 ³⁰ | Genetic characterization of the interaction between sunflower and <i>Orobanche cumana</i> - LOUARN J., M. C. BONIFACE, POUILLY N., VELASCO L., P. VINCOURT, B. | Invited Speaker Prof Dr Nurhan TURGUT DUNFORD Sunflower Oil: A Premium Oil for Food Applications | | |

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| | PÉREZ-VICH, MUNOS S. | | |
| 10 ³⁰ -10 ⁵⁰ | Study of <i>Orobanche cumana</i> genetic diversity – M. COQUE, T. ANDRE, R. GIMENEZ, M. ARCHIPIANO, L. POLOVYNKO, M. C. TARDIN, C. JESTIN, B. GREZES-BESSET | Invited Speaker DR. LEONARDO VELASCO Source and sink affect phytosterol concentration and composition of sunflower oil | |
| 10 ⁵⁰ -11 ⁰⁰ | Discussion | Discussion | Discussion |
| 11 ⁰⁰ -11 ²⁰ | Coffee break | Coffee break | Coffee break |
| 11 ²⁰ -12 ³⁰ | 8th Session: Chair: DR LOREN H. RIESEBERG | 8th Session: Chair: DR LEONARDO VELASCO | 8th Session: Chair: PROF DR ZHAO JUN |
| 11 ²⁰ -11 ⁴⁰ | Invited Speaker DR LAURA F. MAREK | Oil content and oil quality characteristics of linoleic and high-oleic sunflower varieties cultivated in Turkey – B. ASKIN, M. AFACAN, V. BİCER, Ö. KARADAS, İ. KONUK | Quality characteristics of roasted sunflower seeds during storage - M. B. BAHAR, F. SEYHAN, B. OZTURK, B. TOPAL, F. S. BAYRAKTAR |
| 11 ⁴⁰ -12 ⁰⁰ | Sunflower Genetic Resources | Determination of Textural, Rheological Properties and SFC, SMP Values of Oleogels Prepared Using Sunflower Oil – H. PEHLİVANOĞLU, O. S. TOKER, H. IMAMOĞLU, M DEMIRCI | Effect of different storage conditions on quality properties of raw and roasted sunflower kernels – F. SEYHAN, M. B. BAHAR, B. TOPAL, B. ÖZTÜRK, F. S. BAYRAKTAR |
| 12 ⁰⁰ -12 ²⁰ | Four decades of sunflower genetic resources activities in India – M. DUDHE, S. MULPURI | Assessment of sunflower oil adulteration – A. CEVIK, A. UNVER | The Evaluation of Sunflower Harvest Waste as Silage Feed – S. BUYUKKILIC BEYZI, M. YILMAZ, Y. KONCA |
| 12 ²⁰ -12 ³⁰ | Discussion | Discussion | Discussion |
| 12 ³⁰ -13 ³⁰ | Lunch (Courtesy of Edirne Commodity Exchange) | | |
| 13 ³⁰ -15 ³⁰ | 9th Session Chair: DR ABELARDO DE LA VEGA | 9th Session Chair: PROF DR NURHAN T. DUNFORD | 9th Session Chair: PROF DR SEVGI CALISKAN |
| 13 ³⁰ -13 ⁵⁰ | Invited Speaker DR NADA HLADNI | The effects of vacuum and atmospheric deep-fat frying process on total frying-use time of sunflower oil and on french fries quality – E. DEVSEREN, D. TOMRUK, U. BAYSAN, M. KOC, H. KARATAŞ, F. ERTEKIN | Study of the characteristics of cultivated varieties of sunflower, regarding the production of high quality sunflower meal with dehulling process - S. DAUGUET, F. LABALETTE, F. FINE, P. CARRE, A.MERRIEN, J. P. PALLEAU |
| 13 ⁵⁰ -14 ¹⁰ | Present status and future prospects of global confectionery sunflower production | Effect of curcumin nanoparticles on oxidative stability of sunflower oil-in-water emulsions – F. BOZKURT, M. T. YILMAZ, C. YILDIRIM | Acceptability of chapati Made With Supplementation of Sunflower (<i>Helianthus annuus</i> L.) Seed Meal – M. KARWASRA, S. DHIYA |

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| 14 ¹⁰ -14 ³⁰ | Grain, kernel and hull characterization of oilseed and oilseed x confectionary genotypes- S. ZUIL, M. LAUREANO, P. ROCCA, M. DELLA MADDALENA | Application of artificial neural network on prediction of moisture content of the deep-fat frying of beef meatballs in sunflower oil-H.I. KOZAN, C. SARIÇOBAN, H. AKYÜREK | Some Antinutrients and in vitro Protein Digestibility of Home Processed Sunflower Seed Meal – M. KARWASRA, S. DHIYA |
| 14 ³⁰ -14 ⁵⁰ | Effects of herbicide and salinity stresses on some defense responses of sunflower plant- A. KAYA | Effect of the Deep-Fat Frying Process on Aroma Compounds of Sunflower Seed Oil – S. KESEN, A. S. SÖNMEZDAĞ, A. AMANPOUR, H. KELEBEK, S. SELLI | |
| 14 ⁵⁰ -5 ⁰⁰ | Discussion | Discussion | Discussion |
| 15 ⁰⁰ -15 ³⁰ | Coffee break | Coffee break | Coffee break |
| 15 ³⁰ -17 ⁰⁰ | 10th Session Chair: DR PIERRE CASADEBEIG | 10th Session Chair: DR SUSAN THOMPSON | 10th Session Chair: DR NICOLAS LANGLADE |
| 15 ³⁰ -15 ⁵⁰ | Quantitative Determination of Sunflower in Mixed Concentrate Feeds by Real Time PCR- M. KAYA,Z. KIYMA | The Effect of the ESSENTIAL OIL from <i>Citrus aurantium</i> as a source of natural antioxidant in sunflower oil – O. ERDOĞDU, A. BOZDOGAN | The Meeting of International Consortium for Sunflower Genomic Resources |
| 15 ⁵⁰ -16 ¹⁰ | The evaluation of annual wild <i>Helianthus</i> species for their morphological, phenological and seed chemical characteristics in field conditions – F. ONEMLI, G. ONEMLI | LC-DAD/ESI-MS/MS Characterization of Phenolic Compounds of Sunflower oil – H. KELEBEK, S. SELLI, A. S. SÖNMEZDAĞ, S. KESEN, G. GUCLU, O. KOLA | |
| 16 ¹⁰ -16 ³⁰ | | Lessons from ten years of an interprofessional survey plan on sunflower food safety - S. DAUGUET, F. LACOSTE | |
| 16 ³⁰ -16 ⁴⁵ | Discussion | Discussion | |

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| 16 ⁴⁵ -17 ⁴⁵ | ISA GENERAL ASSEMBLY |
| 17 ⁴⁵ -18 ⁰⁰ | <i>Closing Ceremony</i> |
| 19 ³⁰ -23 ³⁰ | GALA DINNER |

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| | 02.06.2016 THURSDAY |
| 09 ³⁰ -12 ⁰⁰ | Field Day in Trakya Agricultural Research Institute Visiting Demo Plots |
| 12 ⁰⁰ -13 ⁰⁰ | Lunch |
| 13 ³⁰ -17 ³⁰ | Edirne City Tour |
| 17 ³⁰ - | Free Shopping Time |

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| | 03.06.2016 FRIDAY |
| 07 ⁰⁰ -19 ³⁰ | Istanbul City Tour |
| 19 ³⁰ -23 ³⁰ | Bosphorus Yacht Tour and Dinner |

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CYTOGENETIC STUDY OF HELIANTHUS STRUMOSUS AND ITS F₁ AND BC₁F₁ HYBRIDS WITH CULTIVATED SUNFLOWER

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ABSTRACT

Helianthus strumosus L. is represented in Novi Sad collection of wild sunflower species with large number of accessions (14 with seed reserves and 20 in the field collection). It is often used as a source of resistance to disease-causing agents in the breeding of cultivated sunflower. Interspecific crosses with cultivated sunflower lines were performed using 17 accessions of this species. Six F₁ hybrid combinations were obtained using two *H.strumosus* accessions with a total of 48 plants, while in backcrossing 51 BC₁F₁ plant was obtained. Nine originated from crossing F₁ and 42 from crossing F₁OP with cultivated sunflower. Cytogenetic analysis showed 3 levels of ploidy in the examined accessions of *H.strumosus* (n = 17, 34 and 51) and high pollen viability ranging from 83.13- 98.93%. F₁ hybrids exhibited reduced pollen viability (26.83 - 55.34%), and there were occurrences of male sterility. Analysis of chromosomal association of F₁ hybrids showed that chromosome number was 68, and that most commonly observed associations were 25-34 bivalents with the occurrence of quadrivalents, hexavalents and univalents. BC₁F₁ hybrids also had male sterile plants, while pollen viability ranged from 5.66 - 80.85%. Analysis of chromosomal associations in diakinesis showed a varying number of chromosomes (55 - 70), while the number of bivalents was 15-27, trivalents 0-3, quadrivalents 0-4, hexavalents 0-1 and univalents 1-5. In addition to irregular patterns of chromosome pairing in diakinesis, F₁ and BC₁F₁ hybrids also exhibited irregularities like fast, lagging chromosomes and chromosome bridges in other stages of meiosis. Cytogenetic analyses show the difficulties in obtaining progenies of interspecific hybrids that will contain the desirable genes from *H.strumosus*.

Key Words : Sunflower, *Helianthus strumosus* L., Interspecific crosses, Cytogenetic analyses