INTERNATIONAL SOCIETY FOR HORTICULURAL SCIENCE

Section Tropical and Subtropical Fruits

Newsletter No 17 June 2017

Dear Colleagues,

We have successfully organized the International Symposium on Flowering, Fruit Set and Alternate Bearing at Palermo, Italy from 19-23 June, 2017. It was attended by more than 100 researchers from about 25 countries. The field trip was exciting. We are trying to develop a Working Group to continue the series of the symposium.

In the coming months of this year the Section is organizing two important symposia, (i) IX International Pineapple Symposium at Havana, Cuba from 15-19 October, 2017 and (ii) V International Symposium on Papaya at Merida, Yucatan, Mexico from 24-27 October, 2017. The International Tropical Fruits Network (TFNet), Malaysia is organizing a symposium on International Symposium on Tropical Fruits in collaboration with FAO and Government of Fiji from 23-27 October at Nadi, Fiji. (please see the details in this Newsletter)

We have our main event International Horticultural Congress (IHC2018) to be held at Istanbul, Turkey from 12-16 August, 2018. In IHC2018, the Section is responsible in organizing five different symposia (please see details in this Newsletter)

We are including some focused articles in each issue of the Newsletter. I welcome your contribution for the coming issues.

With regards,

H. Jaenicke
Vice-Chair

S.K. Mitra
Chair

Section Tropical and Subtropical Fruits

MANGO IN BRAZIL: PRODUCTION AND BREEDING ASPECTS

Mango is an important tropical fruit crop of Brazil which represents the seventh in the ranks among the most important mango producing countries in the world. According to literature the total cultivated area of mango in Brazil is around 75 thousand hectares with a production of 1.2 million of tons. The main producing regions are Northeast (Petrolina, Livramento e Dom Basílio counties in San Francisco Valley at Pernambuco and Bahia States) and Southeast (Monte Alto and Taquaritinga in São Paulo and Janaúba e Jaíba counties in Minas Gerais). These areas varies from 5 to 25 thousand hectares and the largest area is concentrated at San Francisco Valley in the irrigation perimeter or production irrigated poles. Pernambuco and Bahia States responsible for 85% of all Brazilian mango export (Anuário Brasileiro da Fruticultura, 2011; 2012; 2013; 2014; 2015; 2016; 2017).

Brazilian mango exports from 2011 to 2013 were almost the same (127 and 122 thousand tons in 2012 and 2013,respectively) but between 2014 to 2016 mango export increased from 133 to 154 thousand tons whose production values were about 180 millions of dollars and San Francisco Valley was the area responsible for that production. Although 85% of the Brazilian production is concentrated in San Francisco Valley, it is estimated that only 30% of this production goes to external market and 70% is commercialized in the national market.

Figure 1a. Hybrids from Embrapa Semiarid at Mandacaru Experimental Station.

Tommy Atkins cultivar is still the most important cultivar in this region, however, there is an increasing tendency of the market for diversification of new cultivar, such as Keitt, Kent and Palmer. Palmer is produced mainly in São Paulo State (Anuário Brasileiro da Fruticultura, 2011; 2012; 2013; 2014; 2015; 2016; 2017). Tommy Atkins cultivar is still preferred by producers because of its good response to flower induction by chemicals and resistance to transport and, in addition, its market quality (attractive blush, acceptable fruit size, consistent and low fiber pulp). On the other hand, Tommy Atkins is highly susceptible mango malformation (vegetative and flower malformations) as well as physiological disorder on pulp named “soft nose” and, in addition, its fruit flavor and sweetness are only fair (Pinto et al., 2002a; 2002b).

Since mango tree is an alogamous and heterozygous plant from which comes out many natural hybrids. These hybrids are well adapted to local soil and climate conditions resulted development of many Criola varieties in Brazilian territory most of them showing polyembrionic characters. Brazilian consumers enjoy these national Criola varieties, such as Rosa, Espada, Jasmin and Coité in Northeast and Ubá in Southeast which is largely used for juice processing due to its sweetness.

Figure 1b. Hybrids from Embrapa Semiarid at Bebedouro Exp. Station.

The mango breeding program in Brazil has different objectives based on the market demand and also vary among the Research Centers. While Embrapa Semiarid Research Center in Petrolina, Pernambuco State, priories the development of cultivar for the external market, Embrapa Medium-North, in Teresina, Piauí State, concentrates developing cultivars for domestic market. Fi Embrapa Cerrados, in Brasília, Federal District, has both objectives to develop cultivars for both domestic and export market.

Techniques are also different among these Research Centers, since researchers from Embrapa Semiarid and Embrapa Medium-North collect fruits of a selected mother plant (e.g. cv Rosa) to obtain half-sib progenies from open pollination once this crops has high level of cross fecundation. Embrapa Semiarid specifically used Tommy Atkins as male parent in an open pollination technique and 2.775 half-sib progenies have been developed which are presently under evaluation (Figure 1a, 1b and 1c). However, there is a new plan to select plants from germplasm bank (Figure 2) under green house to promote a polycross in order to increase population of progenies. On the other hand, researchers from Embrapa Cerrados started the mango breeding program in 1980 and they used hand or controlled pollination in order to get the full-sib progenies. Five hybrid cultivars; Alfa, Beta, Lita, Ômega and Roxa, were released. In addition, more than 400 progenies from the cross between 1994 to 2004 have been evaluated and six advanced selections are ready to release. The advanced hybrid selection CPAC 329/94 (Figure 3) showed excellent characteristics of dual purpose use- fresh consumption as well as for processin.

The University of Viçosa, in Viçosa, Minas Gerais State, and Instituto Agronômico, in Campinas, São Paulo State, have been involved in a breeding program by using direct or select cross in order to develop mango cultivars resistant to a serious disease named “Seca” (drying) which is caused by the fungus *Ceratocystis fimbriata*.

Brazilian mango breeders are engaged to develop important new cultivar/s whose performance on production and quality will be superior to Tommy Atkins and have good acceptance in the internal and external market. The new breeding strategies may increase the number of progenies thus facilitating the selection of new progenies in quality in quantity.

Figure 1c. Fruits from hybrids obtained and evaluated by Embrapa Semiarid.

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Figure 2. Germplasm bank from Embrapa Semiarid.

Figure 3. The advanced hybrid selection CPAC 329/94 has a high quality fruit with double purpose for fresh consumption and processing.

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Papaya Research at CICY, México

Papaya is an important crop worldwide, each year thousands of hectares (400,000 has.) are cultivated, and almost 13 million tons are produced each year. Its main producer is India (that produces 45% of the worldwide production), followed by Brazil, Nigeria, Indonesia and Mexico.

The papaya industry in Mexico

Mexico occupies the fifth place in the world in terms of production with 883 thousand tons per year, that represent a value of around 22 million USD per year. Nevertheless, Mexico is the main papaya exporter in the world exporting 132 thousand tons, with a value of 87 thousand millions USD, followed by Brazil, USA, Honduras and Guatemala. Most of the papaya from Mexico is currently exported to the US. Each year papaya is grown in Mexico in at least 17,000 ha in 15 different States. The five main papaya producing States in Mexico are: Oaxaca, Chiapas, Colima, Veracruz and Michoacan (Fig. 1). In Mexico, the main problems of papaya cultivation are the lack of new varieties adapted to the local soil and weather conditions, the incidence of diseases such as PRSV virus diseases, anthracnose, as well as a high production cost. Maradol is the main cultivar of papaya grown in Mexico.

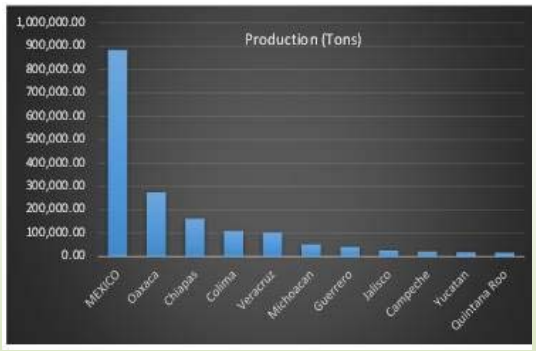

Figure1.Production (tons) of the 10 Main papaya growing States in Mexico (in 2015).

Southern Mexico and Central America are considered as the centre of origin of *Carica papaya* L., thus, there must be an important genetic pool in the native populations of *C. papaya* from these regions. At the Plant Molecular Physiology Laboratory of the Yucatan Centre for Scientific Research (CICY), México, we have been working for more than 18 years in a comprehensive genetic improvement program for papaya. CICY has developed two new varieties (Kanput and Chakput) which are producing fruits of average 15 cm in length and 400 g in weight. These varieties are suitable for export market. (Figure 2). These varieties have been registered at the National Catalogue of Plant Varieties (CNVV), and CICY owns the rights for both varieties, granted by the National Ministry of Agriculture (SNICS, SAGARPA).

We have also developed an efficient protocol based on *in vitro* culture techniques, to produce 100% hermaphrodite papaya clones, that it is currently in the process of evaluation as a patent, at the Mexican Institute for Intellectual property (IMPI).

In addition, we have various candidate genes mainly transcription that may contribute to our knowledge of the molecular basis of papaya to deal with anthracnose, to tolerate exposure to drought and heat of this tropical fruit in a climate change scenario. Some of those genes can be used to generate new varieties with increased disease resistance and increased resistance to drought and heat. We have also tested recently, the performance of our papaya clones under greenhouse conditions, with excellent results in terms of fruit quality and low incidence of phyto-pathological problems. We will discuss all these and show our on-going research to participants of the V International Symposium on Papaya to be held here from 24-27 October, 2017.

V International Symposium on Papaya (ISHS).

V International Papaya Symposium (ISHS) will be organized for the first time in the American continent. The previous 4 were organized in Asia (Malyasia, India, Thailand) and Australia. It will take place in Mérida, Yucatán, Mexico, from October 24 to 27,2017 (please see announcement in the forthcoming events in this e-Newsletter). The objective of this V International Papaya Symposium will be to review the state of the art on research and technological developments achieved by the different research institutions around the world, to offer a forum to get together researchers and papaya growers, to define the direction of future research programme.

In order to achieve the objectives, we have invited experts from various regions of the world including India, Hawaii, Brazil, Costa Rica, Canada, and they will address important topics that include Genetic and Genomics aspects, tolerance to diseases, resistance to abiotic factors, micropropagation, nutraceutical aspects, as well as agronomical challenges and export markets strategies.

Kanput

Chakput

In addition, we are organizing a forum of experts to review the papaya industry in India, Brazil, Costa Rica and, of course, Mexico. This forum will allow the exchange between the different actors of the productive chain of this fruit, producers, technicians, marketers and exporters, with the researchers and people responsible for the technological developments, from different parts of the world.

This symposium is a unique opportunity to review the research achievements carried out in this important fruit at the various research centres around the world. It is expected that at the end of the symposium we will have a diagnosis of the current situation of the papaya at the global level, and perhaps some ideas of where the research and development efforts in papaya should be directed in the following years.

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Mexico

Countdown for Jackfruit Development in India has begun, but .....

A movement for jackfruit development is on in India since a decade. Though India is the largest producer of Jackfruit in the world, unfortunately, it remains under-utilized.

Jackfruit trees are available almost throughout the India except in Kashmir. The production area is comparatively less in many states like Rajasthan. Karnataka, Kerala, Maharashtra while West Bengal, Odisha and north eastern states(Assam, Tripura, Meghalaya, Nagaland etc.) have good plantations. Unfortunately, only three states, i.e. Kerala, Karnataka and Maharashtra are doing value addition of Jackfruit. In Maharashtra, Phanas Poli, a kind of sweet preparation from soft-fleshed jackfruit pulp is the main product. In Karnataka, industries and households make about 30 lakh (one lakh=100,000 thousand) jackfruit papads. Kerala has its own unique dessert from jackfruit called chakka varatty. All these three states make namkeen chips from raw jackfruit. Kerala has gone far ahead in mass awareness creation about jackfruit. Not less than three dozen industries are making different value added products in the state. Of course, all these are small industries or can be termed as big home industries. Only full-fledged industry on Jackfruit, M/s Artocarpus Foods Pvt Ltd of Kannur is also in Kerala State.

A Jackfruit Pulp & Milk preparation- Milky Jack from Milma

Interestingly most of these industries are producing a number of innovative products and hasn't stuck to the traditional chips and chakka varatty. Dehydrated raw jackfruit, Jackfruit squash, jam, jackfruit halwa, Jackfruit pulp, jack seed powder, jack seed coffee etc are some of the popular products. Credit for developing technology for jackfruit pulp making goes to Maharashtrians. Learning from them, today in Kerala and Karnataka, at least six units are making jackfruit pulp. Jackfruit pulp is a semi finished product from which a number of end products like payasam, toffee, ice-cream, modak, and jackfruit bar etc can be made. Credit for popularizing jackfruit pulp, a hitherto unheard product in Kerala five years ago goes to Subhash Koroth of Artocarpus Foods. He has extensively travelled in Kerala offering samples of jackfruit pulp and encouraging many food industries to use this in their products. As a result, Milma has come out with three products from this pulp – Jackfruit ice-cream, jackfruit peda and Milky Jack. Olio is a leading company that is now bringing out jackfruit cup cake. Joy Ice cream is using jackfruit pulp for ice-cream making. Two earlier small time ice-cream makers, chickoos ice-cream of Palakkad and Anna Foods of Wayanad are now producing many jackfruit products apart from jackfruit ice-cream. The former's owner, Mruduvarnan has bought a truck and running it as Chakka Vani meaning Jackfruit truck. In addition to Jackfruit ice-cream, the truck carries a host of jackfruit products including grafted plants. Johnson, owner of Annas Foods has started a regular shop for jackfruit products in Wayanad. Two other regular shops that are exclusively for jackfruit products or have a good jackfruit section are Chakkare of Kottayam, Prapancha Green Mart Kollam. Navya Bakers of Ernakulam that has twenty branches in two districts makes chakka varatty for 9 months a year and sells it round-the-year. Their annual chakka varatty production is highest in the country.


Jackfruit Papad. Karnataka makes 30 lakh papad every year

Highest jackfruit user for commercial purpose is M/s Natural Ice-cream of Mumbai. Every year, they buy jackfruit from farmers and make 25 tonnes of pulp which they use for their jackfruit ice-cream making for the year. This company's jackfruit ice-cream contains small bits of the fruits too.

Jack seed is one of the raw materials that no jack growing country has been successful in utilizing properly. Sri Lanka is making value addition of jack seeds. Artocarpus Foods and Peoples Social Service Society (PSSP), Palakkad, and another 10-12 small industries are making jack seed products. A Kannur company has brought out chapathi that uses jack seed flour. Chapathi flour, Avalose Podi, Puttu Podi, cake, Jack seed halwa and a host of products are made from jack seed. Another new development from Kerala is bringing raw jackfruit carpels in freeze dried form. Jackfruit activist James Joseph's company "jackfruit 365" has achieved it. Thanks to this product that's now available online and in retail in some parts of Kerala, it is easily accepted by 5 star hotels, for the first time in the country. James' persistent efforts has brought another interesting information that raw jackfruit is good add-on diet for diabetics. Raw jackfruit has low glycemic index as compared to rice or wheat. Today a good number of diabetics in Kerala and abroad are using raw jackfruit. Demand for the traditional staple preparation, Chakka Puluk made from raw jackfruit has increased, so also its demand from gulf and other countries where there is a good number of ethinic population. In collaboration with another company, Jackfruit 365 is shortly launching insoluble fibre enriched raw jackfruit flour to be used as ready add on for diabetics diet.

Jackfruit Pulp is a semi finished product from which a number

Maharashtra, apart from phanas poli, makes another jackfruit product – Phanas Bhaji. It is canned tender jackfruit to be used as vegetable. Two big companies and 3 smaller units are regularly producing this, again on a very small scale. They have their own practical reasons that don't permit them to scale up, though there is good demand for this. Karnataka produces an estimated 30 lakh Jackfruit papads. These papads can be oil fried or micro-waved. It makes a good snack. Unfortunately, jackfruit papad industry is not mechanized. It can't be made by using chapathi machine or blackgram papad machine. If only serious R & D efforts are done and machines are made available, Papad industry can grow in a big way. Even if production goes four-fold, demand won't diminish. This because like many jackfruit products, papad gets exhausted once the season is over.

Mother diary's RTC tender Jackfruit packet in Newdelhi. Unfo

Sri Lanka has 14 organizations that offer training on jackfruit value addition. Unfortunately India doesn't have even one that does it regularly. Jackfruit is available in Panruthi, the so called 'Jackfruit Paradise' of Tamil Nadu, India, for all 365 days. Similarly, in Kerala, though at different pockets, it is available throughout the year. Now, at least a dozen industries of Kerala are producing jackfruit products round-the-year. Jack Fests have played a very important role in popularizing jackfruit and inspiring people to take it as a commercial crop. Till now more than 150 Jack fests are conducted in Kerala and Karnataka. The concept of Jackfruit Fest has now spread to Goa, Maharashtra and North East as well.

Ready To Cook (RTC) vegetable made from tender jackfruit has very good scope for acceptance because of its zero-pesticide residue and nutritional values. Ready To Eat (RTE) jackfruit or pre-packed jackfruit ripe bulbs have great potential to be sold in super markets and malls. India badly needs a technology to carry out its best fruits in minimally processed pre-packed form to North India and elsewhere in the country where it can be marketed well with proper promotion. Karnataka has geared up in a big way for opening doors for orchard cultivation (monocrop) of Jackfruit. According to Dr VS Hittalamani, (retired senior horticulture officer), in drier districts of the state 3,000 hectares of jackfruit plantation has come up. Toobugere Jackfruit Growers Association, the only jackfruit farmer's organization of the country, supported by the University of Agriculture Sciences, Bengaluru. Dr Narayana Gowda, (retired Vice Chancellor of UAS Bengaluru) has helped to develop the organization. The estimated income of jackfruit farmers from 3000hectares was 3 lakh Rs in 2009 increased to 28 lakh Rupees in 2016. (1 lakh=1550 USD)

Countdown for jackfruit development has begun in India, however still miles to go. There are many challenges, like lack of ready-to-use technologies for industrialization, efficient machinery, sound supply chain, problem in peeling and grading raw material etc.

Jackfruit remains highly under-researched in all the jackfruit growing countries. Why is it so? Scientists, Governments & Development agencies from all jackfruit growing countries have to seriously think about this collectively. When the western media has already labeled jackfruit as one of the super fruits of 2017, thanks to it's a contribution to dummy meat industry, we in growing countries are still sleeping. When will we realize the actual potential of this wonderful Future Crop?

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FORTHCOMING EVENTS, 2017-2018

Hotel Nacional de Cuba - del 15 al 19 de octubre - La Habana - Cuba

IX International Pineapple Symposium

ISHS

IX INTERNATIONAL PINEAPPLE SYMPOSIUM

Under the aegis of the International Society for Horticultural Science (ISHS)
http://www.ishs.org/symposium/591

Scientific Sessions

- **Management of pineapple agro-ecosystems**

This session attend to management technologies of resilient, organic, agro-ecologic and conventional productive systems and its relation with climatic change, physiology, alternative energy sources, familiar agriculture and limiting yield factors.
Coordinators: Dr. Aldin Solar, Dr. Justo González Olmedo, MSc. Emilio Fardo, MSc. Zulay Castro

- **Genetic resources, breeding and biotechnology**

This session attend to conservation, propagation, characterization, evaluation, biodiversity, breeding and management of phytogenetic resources, by traditional and biotechnological methods in germplasm bank, productive systems, farms and family orchards.
Coordinators: Dra. Fernanda Souza, Dra. Miriam Isidrón Pérez, Dra. Daymara Rodríguez Alonso, Dr. Romelio Rodríguez Sánchez

- **Post-harvest, Industrialization and Commercialization**

This session attend to harvest technologies, physiological and/or microbiological disorders, physiology of fruit maturity, emergent post-harvest technologies, process, products, sub products and industrial technologies, familiar agroindustry and minimum processed products, containers and packaging, quality management systems, innocuousness, standardization, commercialization.
Coordinators: Dra. Martha Hernández, MSc. Rodolfo Morales Pérez

- **Plant protection**

This session attend to diagnostic and characterization of virus and similar pathogens, prokaryotic and fungus; identification and biology of mites, insects, phytoparasitic nematodes, disease vectors and natural enemies; epidemiology; pest management and analyses pest-plant interaction, alert systems for early detection, opportunely response and prevention of the crisis caused by pets.
Coordinators: Dr. Aristóteles Pires de Matos, Dra. Raysa M. González, Dr. Luis Pérez Vicente, MSc. Lester Hernández

The event includes magisterial conferences, sessions for papers presentation and discussion, workshops and guided tours to scientific institutions, fruit groves, industries, mini industries and conditioning and packing houses for tropical fruits.

IHC2018

30th International Horticultural Congress

12 - 16 AUGUST 2018 • ISTANBUL - TURKEY

Please Click ROSA link for Abstract Submission

S38 - 10th Symposium on Temperate Fruits in the Tropics and Subtropics

Conveners

Prof. Giuliano Finetto
Institute of Agricultural Sciences, Verona, Italy

Prof. Maria Luisa Badenes
Instituto Valenciano de Investigaciones, Agrarias IVIA, Valencia, Spain

Prof. Ali Küden
Cukurova University, Adana, Turkey

Many countries in the tropics and subtropics have physiographic features and climatic conditions that could be effectively exploited for the production of deciduous fruits. The potential for development of temperate fruits in the tropics and subtropics depends on continuous improvement on technology for production and post harvest management, development of low- chill requiring cultivars and rootstocks. Market niches that were not previously considered accessible are now being targeted with temperate fruit from tropical and subtropical regions. The growing temperate fruits in tropical and subtropical regions in many countries have significantly improve the socioeconomic status of poor ethnic minority groups living in areas where low-chill temperate fruits can be successfully grown.

This symposium is aimed to address sustainability of deciduous fruit production under changing climatic conditions of tropical and subtropical regions. The symposium is expected to gather about 150 researchers, growers, nurserymen, and commercial horticulturists together to discuss the latest scientific findings and to address current and future challenges of climate change impact and mitigation strategy for the temperate fruits in the tropics and subtropics. Participants who have common research interests can be promoted to establish new networks especially through this working group.

Main themes:
Breeding, low chill temperate fruit cultivars
Climate change effects and mitigation strategy
Sustainability of deciduous fruit orchards
Modeling systems on chilling accumulation
New strategies and chemicals on bud break, pests and disease management
Postharvest management and value addition

Scientific Committee:
A.B.Kuden, University of Cukurova, Turkey and Working Group Chair (FTS/SH)
Sisir Mitra, Chair, Section Tropical and Subtropical Fruits, ISHS
Amru Bin Ismail, University of Putra Malaysia, Malaysia
Maria Antonietta Germana, Universita Degli Studi Di Palermo, Italy
S.S.Roy, ICAR Research Centre, Manipur, India
Po-An Chen, National Taiwan University, Taiwan
Sadiye Gozlekci, Akdeniz University, Antalya, Turkey
Naoko Kozai, Kagoshima University, Japan
Raphael A.Stern, MIGAL, Galilee Technology Centre, Israel

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S5- Tropical and Subtropical Fruits
(7th International Symposium)

Conveners

Prof. Dr. Sisir Mitra
West Bengal, India

Dr. Hannah Jaenicke
Grafschaft - Gelsdorf, Germany

Assoc. Prof. Dr. Mustafa Akbulut
Tayyip Erdogan University, Rize, Turkey

Largely, all tropical and subtropical fruits are produced in the developing countries of Asia, Latin America and Africa. The tropical and subtropical fruit industry is an important sector in many countries in generating income and employment, provides foreign exchange earnings and as an important sources of nutrition and dietary requirement for healthy population. The potential for development of tropical and subtropical fruits depends on continuous improvement on technology for production and postharvest management. The tropical and subtropical fruits have wide array of challenges and opportunities to different stakeholders. In many countries, these fruits are faced with the problems of biotic and abiotic stresses, which need to be addressed in the right earnest. This symposium will provide the platform for participants to engage in a commodity that can contribute to food security, provide nutrition and well being, improve livelihood and alleviate the impact of climate change.

Main Themes:
- Germplasm, diversity and breeding
- Production technology and physiology
- Pest and disease management
- Molecular Biology and biotechnology
- Postharvest and processing technology
- Economics, marketing and trade
- Citrus growing & physiology

Scientific Committee:
- Domingo Haroldo Reinhardt (Chair, Working Group on Pineapple Embrapa Cassava and Tropical Fruits, Brazil)
- Ping Lu (Chair, Working Group on Mango Nakara NT, Australia)
- Vishal Nath (Chair, Working Group on Lychee, Longan and other Sapindaceae Fruits NRC on Litchi, India)
- Carlos Antonio Fernandes Santos (Chair, Working Group on Guava and other Myrtaceae Embrapa CPATSA, Petrolina, Brazil)
- Aysin b.Kuden (Chair, Working Group on Temperate Fruits in the Tropics and Subtropics University of Cukurova, Turkey)
- Wen-Li Lee (Head, Fengshan Tropical Horticultural Experiment Branch, Taiwan Agricultural Research Institute, Kaohsiung City, Taiwan,R.O.C.)
- Ali R.El-Sherif (Kafrelsheikh University Egypt)
- Luo Ximing (Institute of Tropical and Subtropical Cash Crops, Yunnan, China)

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S7- Jackfruit and other Moraceae
(2nd International Symposium)
Conveners
Prof. Dr. Sisir Mitra
West Bengal, India
Dr. Hannah Jaenicke
Assoc. Prof. Dr. Mustafa Akbulut
Main Themes:
- Genetics, breeding and biotechnology
- Propagation and production technology
- Reproductive physiology
- Pest and disease management
- Postharvest technology and value addition
Scientific Committee:
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30th International Horticultural Congress
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S6- Avocado
Conveners
Prof. Dr. Sisir Mitra
West Bengal, India
Main Themes:
Scientific Committee:
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Sep 15 Deadline of Full Papers
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• Crop Diversification & Varietal Improvement
• Molecular Biology and Biotechnology
• Crop Protection
• Postharvest & Product Development
• Agrotourism
• Agribusiness, Marketing, & Trade
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