



INTERNATIONAL SOCIETY FOR HORTICULTURAL SCIENCE

Section Tropical and Subtropical Fruits

Newsletter No 11 July 2014

Dear Colleagues,

Thanks for your continued support for compiling the e-Newsletter of the Section Tropical and Subtropical Fruits.

We are now anxiously waiting for the mega event of the International Society for Horticultural Science i.e., 29th International Horticultural Congress to be held at Brisbane, Australia from 17-22 August 2014. You may know that the Section, Tropical and Subtropical Fruit is organizing the following events during the Congress.

- IV International Symposium on Papaya
- VIII International Pineapple Symposium
- IV International Symposium on Tropical Wines
- International Symposium on Tropical Fruit and
- International Symposium on Mango

I am organizing an evening workshop on "Quality Planting Materials" on 21 August 2014 from 17.00-18.30 hours at the Congress venue.

I would like to request all the congress participants to enjoy the Brisbane congress and attend the different symposiums and workshops to be held during the congress.

I believe you will enjoy reading the e-Newsletter and I will look forward for your comments, suggestions and inputs for the coming issue.

With best wishes,

Professor SisirMitra

Chair

Section Tropical and Subtropical Fruits



Mango production in Okinawa, Japan

Okinawa Prefecture is located in southeastern Japan and comprises an area of 2,276 square kilometers. The prefecture includes more than 150 islands and its main island, Okinawa, lies 1,554 km from Tokyo. The average minimum temperature on the main island is 14.6 °C and the island receives an average annual precipitation of 2,000 mm per year. In the Yaeyama Islands, which are located in the southeastern part of Okinawa Prefecture, the average minimum temperature is 16.5 °C and the area receives an average annual precipitation of 2,100 mm. The regional climate is suitable for growing tropical crops such as sugarcane, pineapple, and mango. Although Japan imported 10,055 tons of mango fruit from several countries in 2011, including Mexico and the Philippines (Japan Fresh Produce Import and Safety Association, 2014), another 3,369 tons of mango fruit were produced domestically, and about 48% of which (1,620 tons) was produced by Okinawa (MAFF, 2012). Mangoes produced in Okinawa are shipped to all parts of Japan during the summer, from June to September.

Mango trees were introduced to Okinawa from Taiwan in the 1890s. However, these trees did not initially bear fruit due to dissimilarities in climate. Unlike Taiwan, Okinawa receives a very large amount of rain that falls during the mango flowering season and inhibits fruit set. Farmers in Okinawa studied mango cultivation techniques, and succeeded in growing fruits by covering the trees with plastic sheets to protect the flowers from rain. Using such strategies, mango production in Okinawa has increased since the 1980s.



Mango trees grown
under greenhouse

However, the oriental fruit fly (*Bactrocera dorsalis*) and the melon fly (*Bactrocera cucurbitae*), which had originally precluded shipment of mango fruits to mainland Japan due to the risk of introduction, had been present in the Okinawan islands since 1919. Therefore, a project to exterminate the oriental fruit fly was begun in 1977. Wood chips soaked in pheromones and insecticides were used to lure and kill male flies, and by 1986, the project appeared to have succeeded. A project to exterminate the melon fly had begun earlier, in 1972. Gamma-ray-irradiated male and female melon flies were released to decrease the breeding population in the islands, and eradication was achieved by 1993. Because of these efforts, Japanese consumers can now enjoy domestic mangos without vapor heat treatment.



The most popular mango cultivar in Japan is 'Irwin', which comprises more than 95% of mango production. 'Irwin' has very mild flavor, which is preferred in Japan. Mango trees in Okinawa are grown in greenhouses built using plastic covering (Picture 1). These greenhouses are very important not only to protect the flowers from rainfall during the flowering season, but also to protect the trees from typhoon damage. The Okinawan islands have been struck by typhoons every year (Japan Meteorological Agency, 2014). Typhoons can bring winds of up to 70 m/s and blow mango fruits from their branches. Although farmers have built greenhouses to shield the trees, windbreaks are also used to further shield some of the greenhouses. During the flowering season, the greenhouses also protect the trees from low temperatures. Some farmers, especially on the main island, also warm the greenhouses using heaters.

Because mango trees are cultivated in greenhouses, their height needs to be maintained at about 1.5 m. The width of the canopy can reach 8 m, creating a flat type of canopy that facilitates caring for and harvesting fruits. Because mango fruits that grow under leaf cover develop poor color, farmers sometime orient the fruits into a suitable position to receive more light exposure and improve their color. Farmers further protect each fruit with paper bags or nets to prevent them from falling to the ground (Picture 2). Thus the fully ripen 'Irwin' fruits can be harvested without any damage. Those fruits with the best color can be sold as premium grade Okinawan mangoes.

The best season for tasting Okinawan 'Irwin' mangoes is from June to July. So, if you would like to try these premium mangoes, midsummer is the best season to visit—but hopefully you will be lucky enough to avoid typhoons!



Mango fruits hanged and bagged

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Super fruits

The world fruit market has developed significantly in the past two decades. Aside from quality, the health benefits of fruit consumption have been promoted extensively, and the term "superfruits" gained significant usage and attention in recent years as a term synonymous with the marketing strategy to promote the health benefits of certain fruits, including pomegranates, cranberries and blueberries. In addition, the biodiversity of fruits, i.e., the individual varieties and cultivars, are attracting attention, as the nutrients and bioactive non-nutrients within species can vary dramatically. Several cooperatives and associations that produce and market these fruits have developed an effective strategy using the content of "antioxidants" in their fruits as an indicator for promoting the health benefits of their fruits.

Scientists and nutritionists have differing points of view on the use of the term. Some claim that there is no scientifically objective assessment of the potential health benefits of fruits in this category. Similarly, there is no definitive list of superfruits and new fruits are regularly put forward as superfruits. In addition to pomegranates, blueberries and cranberries, examples include acai, avocado, mangosteen, blackberry, raspberry, strawberry, lingonberry, certain banana varieties and yumberry. However, most fruits are packed with nutrients and yet, some are not perceived as being "Super".

Hence, while there is potential to use this term to some of the lesser known fruits, this development could also potentially have a negative impact on the consumption of the more established tropical fruits, particularly in an increasingly crowded and competitive international fruit market.

The International Symposium on Superfruits: Myth or Truth? was organized at the behest of the Intergovernmental Group on Bananas and Tropical Fruits to examine the use of the term "Superfruit", which has been used successfully particularly by the producers of blueberries and cranberries. The symposium examined latest research findings to determine whether there were nutritional and agronomical evidence to support the claim of a fruit (species and varieties) being a "superfruit" and whether these were adequate to provide a definition.

The symposium also identified threats and opportunities for tropical fruits in the global fruit market, and within the context of enhancing food security through agricultural development, the symposium attempted to identify strategies and models to intrigate small holders in the value chain (Kaison Chang, Secretary, Intergovernmental Groups on Bananas and Tropical Fruits, Trade and Markets Division, Food and Agriculture Organization of the United Nations, Rome)

In regard to scientific definition of "superfruits" the Symposium concluded that the label "superfruits" was based on two criteria: the nutritive value and extranutritional benefits. Although antioxidants capacity is the most widely recognized attribute of a superfruit, most scientists realize that this is only a small part of the overall picture. Bioactive molecules may have potential health benefits independent or additional to their antioxidant effect. Further comprehensive research is needed to fully understand the metabolic pathways and biological role of the bioactive compounds responsible for the benefits observed on health. However, final validation should be obtained with tests *in vivo*.



Blueberry



Cranberry



Pomegranate



Tropical and Subtropical Fruits in India

India is the second largest producer of fruits in the world with an annual production of 81.2 million tonnes contributing 12.6% of world fruit production next only to China (21.2%). Of late, with growing population and realization of commercial and nutritional values, the demand and requirement for fruits has increased manifold globally and so is in India. Since then, India has managed a steady growth in area expansion and production of fruits. Even in 2012-'13, increase in area and production of fruits in India was 4.1 and 6.4 times over 2011-'12. Of these, tropical and subtropical fruits contribute a major share, and the important fruits are mango, banana, papaya, citrus, guava, pineapple, litchi, sapota and pomegranate. Among the minor fruits (less area in cultivation than the major fruits) jackfruit (*Artocarpusheterophyllus*), bael (*Aeglemarmelos*), aonla (*Emblicaofficinalis*), carambola (*Averrhoacarambola*), phalsa (*Grewiasubinaequalis*), passion fruit (*Passifloraedulis*), and tamarind (*Tamarindusindica*) are also growing in many states of India.

Current status

Globally, India is the leading producer of important tropical fruits such as banana (25.6%), mango and guava(44%), and papaya (42.6%). In terms of production in India, banana occupies the first place with 32.6% of the total fruit production followed by mango (22.1%), citrus (12.4%) and papaya (6.6%) respectively though maximum area is registered in mango (2500 thousand ha) followed by Citrus (1042 thousand ha), banana (776 thousand ha) and guava (236 thousand ha) (Table 1).

Mango: The mango is the most popular fruit of India occupying about 35.8% of the total area under fruits accounting for 22.1% of the total fruit production. India has more than 1200 mango varieties. The important mango varieties grown in India are Dashehari, Chausa, Langra, Kesar, Himsagar, Fazli, Alphonso, Amrapali, etc.

Banana: Banana is suitably grown in almost all the states of India and available year-round. Cultivation of banana using tissue cultured plantlets of Grand Naine has revolutionized the banana industry in India. Dwarf Cavendish, Robusta, Poovan, Red Banana are the common varieties grown all over the country. Besides many other indigenous genotypes are also grown in all parts of the country. Banana occupies only 11.1% of total cultivated area under fruits but it contributes 32.6% of total fruit production.





Citrus: Productivity of Citrus is highest in Karnataka (22.0 MT ha⁻¹), followed by in Rajasthan (18.4 MT ha⁻¹). In Arunachal Pradesh and Punjab, limes and lemon are produced year-round. Pramanali, Vikram, ShaiSabarti, PhuleSharbati, Jai Devi and Seedless Lime are the common lime varieties grown in India while Balaji and Rasraj are confined to only few states.

Common lemon varieties like Eureka, Kagzhi Kalan and Assam Lemon are grown all over the country. Sweet lime grown in India includes Mithachikna and Mithotra. In India, Mosambi, Valencia and Blood Red dominate in all the sweet orange growing areas. Best quality mandarins are produced in the country. Nagpur Mandarin, Coorg Mandarin, Khasi Mandarin, Darjeeling mandarin, Kinnow Mandarin etc. have their own unique qualities.

Guava: Guava accounts for 3.9 % of the total fruit production from an area of 3.4 % of the total area under fruits in India. Sardar, Allahabad Safeda, Shweta, Lalit (pink flesh), Allahabad Surkha (deep pink flesh), Khaja (Bengal Safeda) are the varieties growing in different states of India.

Papaya: India is the leading producer of papaya in the world accounting for 42.6% of the total world production followed by Brazil (12%) and Indonesia (7.2%). Pink Flesh Sweet, Coorg Honey Dew, Sunrise Solo, Taiwan, Pusa Delicious, Pusa Dwarf, PusaNanha, Arka Surya, ArkaPrabhat, CO1, CO3, CO4, and CO6 are the varieties grown in different parts of the country. Good papain yielding varieties like CO2, CO5 and CO7 have also been developed and are successfully grown.

Pineapple: Kew, Giant Kew, Queen, Mauritius are the only few varieties successfully grown in different parts of the country. Though the current productivity of pineapple in India is only 14.9 MT ha⁻¹, Karnataka has registered a productivity of 62.7 MT ha⁻¹.

Litchi: India is the second largest producer of litchi after China in the world. In India it is cultivated in about 60000 hectare and production is about 368600Mt of this 80% of area and production is from Bihar. About 50 varieties of litchi are grown in India of which Shahi, China, Bombai, Rose Scented, Muzaffarpur etc. are grown commercially.

Pomegranate: Ganesh, Bhagwa, Jyoti, G-137, Ruby are the important varieties developed in India. Year-round availability of pomegranate in Maharashtra and Tamil Nadu is possible due to its suitable agro-climatic condition and improved production technologies and Tamil Nadu has the highest productivity of 31.3 MT ha⁻¹.



Area, production, productivity and major producing states of major tropical and subtropical fruits in India

Fruit	Area ('000 Hectare)	Production ('000 MT)	Productivity (MT/hectare)	Major producing states
Banana	776.0	26509.0	34.20	Tamil Nadu (19.4%), Gujarat (17.1%), Maharashtra (13.6%), Andhra Pradesh (12.2%), Karnataka (9.5%).
Mango	2500.0	18002.0	7.20	Andhra Pradesh (24.5%), Uttar Pradesh (24.4%), Karnataka (10%), Bihar (7.6%).
Citrus	1042.0	10090.0	9.70	Andhra Pradesh (37.7%), Madhya Pradesh 11.8(%), Punjab (10%), Maharashtra (8.5%).
Papaya	132.0	5382.0	40.70	Andhra Pradesh (30.7%), Gujarat (22.1%), Karnataka (8.6%), Madhya Pradesh (7.7%).
Guava	236.0	3198.0	13.60	Madhya Pradesh (25.0%), Maharashtra (9.5%), Uttar Pradesh (9.1%), Bihar (9.1%).
Pineapple	105.0	1571.0	14.90	West Bengal (19.7%), Assam (17.1%), Karnataka (10.8%), Tripura (10.5%).
Pomegranate	113.2	745.0	6.60	Maharashtra (54.8%), Karnataka (20.2%), Gujarat (10.6%).
Sapota	163.9	1495.0	9.10	Karnataka(25%), Maharashtra (24.4%), Gujarat (20.7%), Tamil Nadu (16.1%)

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Workshop on Quality Planting Materials at IHC 2014 Thursday, 21 August 2014,

Horticulture is one of the harbingers of nutritional security, providing sustainable income to the farmers, generating employment, empowering farm women and earning foreign exchange through exports. Ensuring that farmers have timely access to seed and planting material of good quality is one of the most important elements of successful production and development of horticultural crops. Despite this reality, seed and planting material availability to small-scale farmers in many developing countries is often of insufficient quantity and of inferior quality which undermines potential yield and performance of crop production. Improving the genetic and physical quality of planting materials can trigger production especially if farmers continue to renew their planting materials stock. This workshop will discuss the different aspects of quality planting materials-its importance and constraints-and suggest suitable measures to be undertaken to overcome the identified problems in different countries.



FORTHCOMING EVENTS

Sl. no	Name of Symposium	Symposium Date	Location
1	IV International Symposium on Papaya	August 2014	Brisbane, Australia
2	VIII International Pineapple Symposium	August 2014	Brisbane, Australia
3	International Symposium on Tropical Fruit	August 2014	Brisbane, Australia
4	International Symposium on Mango	August 2014	Brisbane, Australia
5	IV International Symposium on Tropical Wines	August 2014	Brisbane, Australia
6	IV International Symposium on Guava and Other Myrtaceae	24-27 May 2015	Cape Town, South Africa
7	XI International Mango Symposium	28 September – 2 October 2015	Darwin, Australia
8	I International Symposium on Moringa	19-22 November 2015	Manila, Philippines
9	VI International Symposium on Tropical and Subtropical Fruits	26-28 September 2016	Kafr El-Sheikh, Egypt
10	VI International Symposium on Persimmon	21-24 October 2016	Valencia, Spain
11	X International Symposium on Temperate Fruits in the Tropics and Subtropics	18-20 September 2017	Oman