

# *Tropical and Subtropical Fruits*

## *Newsletter n°2*



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### *Foreword*

Time is running very fast, and we apologize this 2<sup>nd</sup> issue coming later than expected. A lot of events have marked these days in the world of horticulture where tropical and subtropical fruits are playing a major role.

In this issue we tried to put the light on Organic Tropical and Subtropical Fruit Production

The organic food industry has been growing remarkably for the past several years. Against the 2-3% growth in the conventional food industry, the organic food industry has been experiencing annual growth between 17% to 20% over the past several years. Global

retail organic food sales, valued at USD 25 billion in 2003, are currently worth USD 31 billion and growing at over 20% per annum. The same is estimated to increase to USD102 billion by 2020.

Organic agriculture is now practiced in approximately 110 countries and its share of agricultural land and farm continues to grow.

### **Markets of organic food**

The major markets for organic food products are in the United States, the European Union (Germany, France, Italy, Belgium and the United Kingdom), and Japan.

The annual market size of natural and organic products in the US is estimated to be anywhere between USD 16.3- 29.7 billion. In 2005, retail sales of organic food and beverages were approximately USD 12.8 billion. Growth rate estimates up to 2010 range between 9% and 16% per annum. A part of the US demand is met from imports. In 2002, the import of organic foods into the US was about USD 1.5 billion.

The EU organic market grew rapidly through 1990s by a range 20% and 40% per annum, but currently the growth has slowed down because the number of regular organic consumers has stabilized. Retail sales of sale grow from USD 10.5 billion in 2002 to USD 12 billion in 2004, at a growth rate of 5% per annum. Germany is the second largest market for organic food and drink in the UK, which achieved estimated retail sales of USD 1.6 billion. Italy and France organic markets, each valued at approximately USD 1.5 billion. The French and UK markets have grown on an average of more than 40% annually since 2001.

Among the more significant countries producing organic products in Asia are China, Ukraine, India, Indonesia and Israel (mainly dried and fresh fruits and vegetables and nuts). Japan is the largest consumer of organic products in Asia. The market was estimated at USD 350-450 million in 2003 and is growing at 20% per annum. The Japanese organic market is characterized as one with high demand, strong purchasing power, and low domestic supply of organic products. On the supply side, the value of Chinese exports grew from less than USD 1 million in 1990s to about USD 142 million in 2003. by 2003, more than 1,000 Chinese companies and farms were certified organic.

*Jacky Ganry, Chair*

*Sisir Mitra, Vice-Chair*

## *News from the countries:*

For this 2<sup>nd</sup> issue, we have focused this item on **Organic Tropical and Subtropical Fruit Production in some countries:** Australia, Mexico, Spain, Taiwan, Turkey, India.

Various contributions were collected by Dr Sisir Mitra.

### **Australia:**

Yan Diczbalis, Regional Industries Development Officer, Centre for Wet Tropics Agriculture, Queensland Department of Primary industries and Fisheries, Australia.

Australian organic and biodynamic growers aim to produce healthy food without the use of synthetic pesticides or fertilisers, while meeting both animal welfare and environmental sustainability standards. In Australia the value of organic production has increased ten-fold between 1990 and 2000 (USDA,

2004), and future growth is expected to be even more rapid, with current forecasts of double-digit growth rates. The number of Australian growers registering for organic certification has increased by 10 per cent annually for the past four years, while average production volumes have increased 15-30 per cent annually (USDA, 2004). This growth contrasts with the long-term national trend of decreasing numbers of farm businesses, with 20,000 fewer farms since the mid-1990's (Anon 2006). In Australia, the total farm gate value of organic produce is estimated to be \$127.9M of which fruit and nuts are valued at \$21.4M representing 16.7% of production.

The Organic Federation of Australia (OFA) was established in 1998 as the peak body for the organic industry in Australia. The OFA fulfils a unifying national role for the organic industry by representing over 20 organic industry organisations (<http://www.ofa.org.au/links/links1.html>). The OFA does not certify farmers, instead their role is to work with all of the organic industry to further the common aims of the movement. The OFA represents the interests of Australia's organic and biodynamic producers to industry and governments at the local, state and federal level.

The production of organic sub-tropical and tropical fruit in Australia is in its infancy but is developing rapidly as it is in many other countries. Producers are increasingly responding to market demands for organic fruits as well as try to position themselves outside of the conventional market system where prices can be marginal for much of the year due to oversupply. Australian farms produce a wide variety of organic fruits including apples, avocados, bananas, grapefruit, lemons, watermelon, olives, oranges, papaya, lychee and rambutan to name a few. Currently the more exotic tropical lines of fruit are produced only on a small number of farms. However, despite the recent development with organic fruit, there is a perceived issue of production seasonality and volumes to meet market requirements.

Before a grower is allowed to use a certified organic label, strict production protocols must be satisfied for a defined period, usually three years. During this three year transition phase, produce is classified and labelled as 'in conversion'. Converting to organic farming can be difficult for farmers. This is a time when advice and training from experts can help farmers develop the management systems needed to ensure success. It was reported that 62 per cent of organic farmers converted their operations from conventional production. This pattern is different for fruit and vegetable producers, where around half directly started up organic farms. Relatively new enterprises in Australian agriculture, such as coffee and tea production, have a larger proportion of growers starting up as organic rather than converting an existing enterprise.

Specific data on sub tropical and tropical fruit production is not collated or readily available due to the fragmented nature of this organic industry segment. In 2001 it was estimated that approximately 1,600 tonnes or 0.6% of Australia banana production was produced organically. This percentage is likely to increase significantly with the recent entry of the Dole Food Company who has recently expressed interest in Australian organic banana production in north Queensland. A Queensland banana company "Pacific Coast Eco Bananas" has taken the step of producing bananas under reduced agrochemical and synthetic fertiliser inputs with nil inputs of nematicides, insecticides and miticides. Their bananas are branded using distinctive coloured wax tips (<http://www.eco-banana.com.au/>) and are reported to receive above market prices in major fruit and vegetable outlets.

The organic sub-tropical and tropical fruit industry is expected to develop further as demand increases, however, a comment is often heard by growers venturing into organic tropical fruit production is that the market is still somewhat reluctant to pay a premium for niche product that already attracts a premium due to their "exotic nature".

Thanks to colleagues Jeff Daniells and Peter Holden who reviewed and commented on a draft of this article.

## **Mexico:**

Miriam Corona, Mexico

Mexico's territory is 1 964 375 Km<sup>2</sup>, and the 15% of it is dedicated to agriculture.

In agricultural and in marketing terms, organics are becoming everyday more important. It is estimated that seven years ago, the organic growing area in Mexico was about the 30 000 hectares; now a days, it has increased up to 30 000 hectares. This sector grows 27% annually.

An interesting data is that in México, there're almost 123 000 organic growers, more than 40% of them are indigenous; from the total, 77% works with less than 5 hectares. In some cases they're organized in small groups or cooperatives; so the positive economical impact, goes straight into their hands.

Today 85% from the organics produced in Mexico goes to the export market, the main destinies for the fresh and dried fruits are: Germany, France, Holland, England, Switzerland, United States and Canada.

The main organic product in México is the coffee, which occupies the 45.26% of the organic growing area. In the case of tropical and subtropical fruits, only 5 659 hectares are dedicated to this cultivation, witch means around the 1.9% from the total organic area.

The tropical and subtropical fruits organically grown in Mexico are mainly: avocado, bananas, mango, pineapple, papaya, guanabana (*Anona muricata*), litchi, persa lemon (*Citrus latifolia*), mexican lemon (*Citrus aurantifolia*), chicozapote (*Achras sapota.*), coconut, carambola, tamarind (*Tamarindus indica*).

Even when the yields are sometimes smaller than in the conventional agriculture, mexican growers are enthusiastic about the organics because of the prices paid (from 20% to 40% more than conventional fruits) and because of the support that government and NGO are giving to organic projects, but there are still problems to solve. According to a survey made by the Agro industrial and Mundial Agriculture Center of Economical, Social and Technological Investigation (CIESTAAM by its name in Spanish) the main problems found between the growers, are the lack of information about organic agriculture, the lack of governmental support and the lack of market connections.

Nowadays around twenty organic certification organizations can be found in Mexico, and at least three of them are national; more companies are working with biological control and integrated management; and the national market starts to be aware of the quality of the fruits they eat.

Mexican natural resources facilitate organic agriculture and its geographical position helps the logistics and commerce witch means a good economical opportunity for reactivate the fields and the small growers. In addition it means a step toward the respect of Mother Earth and the revalorization of antique agricultural practices.

## **Spain:**

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Ecological or organic agriculture in Spain is regulated by the European Union Regulation EC/2092, which establishes production and labelling normatives as well as control mechanisms for this type of production. Each Autonomic Government has its own Regulating Council for Ecological Agriculture (*Consejos Reguladores de Agricultura Ecológica*, CRAEs), which certifies production as well as processed derivatives. The Council promotes its region's organic produce not only on a local level but also in targeted export markets, programs formative activities for growers and horticulturists interested in organic production, and carries out informative campaigns for the general public.

Although Spain, broadly speaking, may be considered a temperate zone country, subtropical fruits like avocado and cherimoya have long been cultivated in the coastal areas of Andalusia and of course in the Canary Islands. Spain produces avocados (over 10,000 ha, yielding some 70,000 tm/year), bananas (around 9,500 ha, of which some 3,000 are greenhouses, yielding 420,000 tm/year; production restricted to the Canary Islands), and cherimoyas (roughly 3,000 ha, producing 33,000 tm/year). Mango (almost 2000 ha) and papaya (around 250 ha, practically all in greenhouse and all in the Canaries) show great potential for future development. Pineapple is steady at around 75 ha, both in open air and greenhouse plantations and, again, restricted to the Canary Islands. Experimental

plantings of litchi show good prospects. Minor crops still being evaluated include carambola, guava, longan, pitaya, mamey, and passion fruit.

Only a very small portion of these crops are currently certified as organic, according to the 2006 census: 350 ha of avocado, 50 ha of mango and 10 ha of avocado in the Spanish mainland, and 127 ha of banana and 40 ha of subtropical fruits (mostly avocados) in the Canaries. There is, however, a clear upward trend throughout Spain, best exemplified by the banana which has more than doubled from the 56,47 hectares under organic cultivation in 2005, most likely caused by the higher prices paid to growers for organic fruit. It is interesting to note that most major packing houses have already had part of their facilities certified apt for manipulating organic produce.

### **Taiwan:**

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Organic production of agricultural products started its pilot project in Taiwan in 1995. The district agricultural improvement stations (DAIS) in different regions in Taiwan took the responsibility of teaching, demonstrating and promoting the organic production of crops at that time. Relevant rules and laws were released beginning from 1999 and thereafter. There were 110 organic fruit farms in Taiwan in the year 2006. After all the efforts, the planting area of organic fruits has increased 3 times from 67 hectares in 1996 to 207 hectares in 2006. The average size of the organic fruit farms is about 2 hectares. There are 34 fruit species grown organically in Taiwan. The more popular species are citrus fruit, peaches, bananas, pineapples, guavas, grapes and papayas.

There are 4 independent private-owned certification bodies responsible for the validation of organic products in Taiwan at present. They are:

- Mokichi Okada Association (MOA) <http://www.moa.org.tw/>
- Tse-Xin Organic Agricultural Foundation (TOAF) <http://toaf.coa.gov.tw/>
- Taiwan Organic Production Association (TOPA) <http://www.topa.org.tw/>
- Taiwan Formosa Organic Association (FOA) <http://www.foa.org.tw/>

These certification bodies are accredited by Taiwan Accreditation Foundation.

The annual imports of organic foods are worth approximately NT\$300 million (US\$9.7 million) and the fifty largest of organic stores have average individual annual sales of only NT\$1 million (\$32,000), according to a report made by American Institute in Taiwan in 2000. However, due to the environmental condition, especially high temperatures and humidity, small individual farm land, high production costs and other unfavorable factors, the production of organic products in Taiwan has not been able to meet the demand of the local market. New technologies, such as novel methods for pest control, and other political measures to enhance large scale production of organic products are needed for further expanding the production of organic products.

### **Turkey:**

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At the initiation of organic agriculture in Turkey, fig and olive growing were more suitable to organic agriculture than the others, but recently, with the increase in the number of the certifying organizations and also the availability of various marketing possibilities, organic agriculture in

different fruits are developed. Now a days fig, olive, citrus, kiwi fruit, pomegranate, loquat, carob, and banana are grown successfully as organic fruits in Turkey.

Organic olive and olive oil production is practiced in Canakkale, Izmir, Manisa, Balikesir, Mugla, Yalova, Antalya, Istanbul, Aydin, Adana, Mersin, Gaziantep and Hatay provinces; organic dry and table fig production in Aydin, Yalova, and Istanbul; organic citrus production in Adana, Mersin, Aydin, Izmir, Mugla and Hatay; organic pomegranate in Adana, Mugla and Antalya; organic kiwi fruit in Istanbul, Trabzon, Yalova and Zonguldak; organic loquat in Tarsus (Mersin); organic banana in Bozyazi (Anamur); organic carob in Antalya are grown as table fruits. Also fig and carob are processed in different ways such as dry fruits and served as organic fruits.

Mainly organic olive is grown in Turkey and produced as table olive or olive oil. The reason of the easiness of organic olive growing was because of not using any pesticides or synthetic fertilizers in most of the traditionally olive growing areas.

Tangerine, lemon, grapefruit and orange are tended to be grown as organic fruits, especially after getting low price in the market. Also, predators are used in these types of citrus orchards but the production of predators is insufficient.

Organic pomegranate growing is very new, however due to the healthy effects of the fruit, organic pomegranate orchards are increasing very fast. There is only one organic loquat orchard in Tarsus (Mersin).

Organic kiwi fruit production is applied in Marmara and Black Sea regions in several orchards, but there are some technical problems in organic kiwi fruit production. When these problems are solved the production will increase.

Banana is only grown in Anamur-Bozyazi in the country. Nowadays, many growers intended to grow organic bananas.

Mango is grown in Anamur but it is a new production for Turkey.

Increase of organic production of subtropical and tropical fruits in Turkey depends on the marketing possibilities, solving of export problems, supporting of organic growers and also depends on the conscious of the community in Turkey.

## **India:**

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INDIA

As per documented evidence, organic agriculture in India started long back in 1900 by Sir Albert Howard, a British agronomist, in local village of North India. Since then, Farmers in some parts of India are practicing it either by default or in absence of resources. The commercial organic farming, as practiced today, is still at a nascent stage. According to a survey of International Federation of Organic Agriculture Movements (IFOAM) and Stiftung Oekologie & Landbau (SOEL), February 2003, India has about 41,000 hectare land under organic management, which is only 0.03% of total agricultural land.

The total Indian organic farming industry is currently (2002) estimated at around US\$ 20 million (Rs. 100 crore). Though very nascent, the Indian organic sector is growing rapidly and has already made inroads into the world organic market in certain key sectors such as tea, coffee, spices, fruits and vegetables (mainly semi processed pineapple, frozen and dried banana, etc.), cotton, cereal (mainly basmati rice), neem, dried nuts, oilseeds (sesame), pulses and sugar (cane).

Indian organic agriculture accounts for a very negligible part of total Indian agriculture production. However, organic produce exports offer India short/ medium term opportunities to add value to its

various crops and be in forefront of the global organic movement, especially with respect to tropical products. Therefore, the thrust of most organic products produced in India is exports, since India has significant strengths in select tropical organic produce in world markets.

The north-eastern (NE) region of India provides considerable opportunity for organic farming and exports due to least utilization of chemical inputs. It is estimated that 18 million hectare of such land is available in NE which can be classified as “organic by default”. Some of the potential crops in the NE that can be exploited for organic production and exports are Joha rice, passion fruits, oranges, Assam lemon, large cardamom and ginger.

With the sizeable acreage under naturally organic/ default organic cultivation, India has tremendous potential to emerge as major supplier of organic products in world’s organic market. However its exploitation is limited on account of lack of awareness of price premium for certified organic produce, certification requirements and its cost, inaccessibility of organic inputs lack of R & D and undeveloped domestic market of organic produce.

(Source: www.eximbankagro.com)

## Global news

- From FAO :



**Hortivar:** We have identified key information about tropical and subtropical fruits in “Good Morning Hortivar”

### Global Horticulture Initiative - Horticultural Crops: The Daily Bread from Gardens and Orchards

Horticultural crop production is an engine for economic growth it creates jobs, supports agri-businesses and generates income to a greater degree than any other agricultural crop.

While generating new economic opportunities, horticulture can diversify cropping systems, reduce pesticide misuse, and conserve soil and water.

Value-addition to horticultural crops generates further employment in the associated agri-businesses and further down the commodity chain from the producer to the consumer.

Horticultural crops provide micronutrients that are essential, yet lacking in the diets of billions of poor people today, and also nutraceuticals that promote health benefits. Fruits and vegetables are the most sustainable and affordable sources of micronutrients in diets.

Horticulture is unique in that it directly addresses poverty and food security issues in both urban and rural areas of the developing world. A strengthened horticulture sector can have a positive impact on all UN MDGs.



## **Second International Symposium on Human Health Effects of Fruit and Vegetables**

United States of America  
Houston, October 9-13 2007

The objective of the 2nd International Symposium on Human Health Effects of Fruit and Vegetables" is to provide a forum for horticultural scientists, nutritionists, food scientists, biomedical scientists, chemists, biochemists, clinicians, medical professionals, social economists to exchange information and bridge the communication gap between the agricultural sciences, nutrition and health sciences. This symposium, sponsored by the 2nd International Society for Horticultural Sciences (ISHS), and Texas A&M University's Vegetable and Fruit Improvement Center (VFIC), and Center for Obesity Research and Program Evaluation (CORPE),. The symposium will be held during October 9 th to 13 th 2007 in Houston, Texas, USA. It will be an unique opportunity for those involved in the functionality of FAV to share ideas and to enjoy Texas hospitality.

Eating Fruits and Vegetables (FAV) is of vital importance to a healthful life. The World Health Organization and the U.S. Surgeon General have recognized potential health promoting properties of FAV and these organizations are encouraging fruits, vegetables and nuts consumption to prevent certain chronic diseases and promote better health. Accumulative evidences based on case-control, cohort and epidemiological studies demonstrated that consumption of FAV reduce the risk of certain chronic diseases such as cancer and cardiovascular diseases.

With the theme of FAV Health 2007, the symposium provides a forum for horticultural scientists, nutritionists, food scientists, biomedical scientists, chemists, biochemists, clinicians, medical professionals, and social economists to exchange information and bridge the communication gap between agricultural sciences, nutrition, and health sciences. Sponsored by the International Society for Horticultural Sciences (ISHS), the Vegetable & Fruit Improvement Center (VFIC) and the Center for Obesity Research and Program Evaluation (CORPE) in the Texas A&M University System and the National Institute for Agronomic Research (INRA), the symposium will be a unique opportunity to share ideas and to enjoy Texas hospitality.

FAV Health 2007 brings together horticulturists involved in breeding and managing FAV to increase their bioactive compounds content, food scientists interested in preserving the quality and functionality of FAV, and nutritionists and clinicians who assess the effects of bioactive compounds found in FAV on a number of health platforms such as obesity, cardiovascular diseases, diabetes, cancer, and other diseases. Industry representatives from commodity groups, processing companies, and federal granting agency representatives will also participate in the conference.

FAV Health 2007 will provide convincing proof of the health promoting properties of FAV and that the future of collaborative research will depend on "table to the farm" rather than "farm to table"

**Health: polyphenols on a plate**

Like vitamins, the polyphenols found in food are beneficial to health. A recent study showed that apples and potatoes alone supply half the total polyphenols obtained from fruit and vegetable consumption in France.

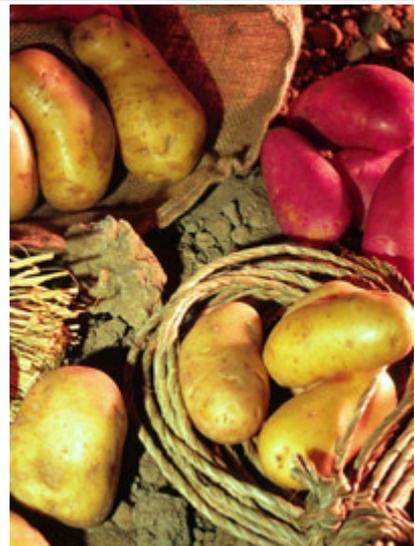
Polyphenols have much better antioxidant properties than vitamins, and have been the object of growing interest on the part of nutritionists, epidemiologists, agrifood firms and consumers over the past decade or so. Their main advantage is that they protect against numerous diseases such as cancer or cardiovascular disease. In particular, they help fight the formation of free radicals in the human body and thus slow cell ageing. They are found in many common consumer products, primarily in fruit and vegetables but also in processed products such as chocolate, tea or wine.

Nobody knew until now the precise total polyphenol content of different foods or the level of consumption in France. A composition table compiled by CIRAD and its partners now goes some way towards providing an answer to those questions. The table was produced under the French Research Ministry's Nutrialis programme. Researchers studied 162 samples from 24 vegetables and 71 samples from 28 fruits. The total polyphenol content of 85 tea samples was also analysed.

Read more at:

<http://www.cirad.fr/fr/actualite/communiqued.php?id=673>

Contact: Pierre Brat, pierre.brat@cirad.fr  
Integrated Food Quality System Joint Research Unit (UMR QUALISUD)



### **Agrodok 5: Fruit Growing in the Tropics - 3rd completely revised edition**

The tropical fruits may be the last group of crops to be touched by science. They have been described and classified by botanists, but their cultivation is still largely based on the insights gathered by many generations of growers. In this respect they differ from the spices (such as clove and pepper) and the plantation crops (coffee, oil palm, rubber, etc.) that played a key role in the exploration and colonisation of the tropical world. These crops became big commodities in world trade, their husbandry being transformed by the impact of long-term research programmes.

As transport improved banana and pineapple (for canning) were also grown on a plantation scale, guided by the findings of research. Around the same time fruit crop research took off in the subtropics, where many crops are grown that are also important in the tropics, such as citrus, mango, avocado. During the last few decennia science is getting involved with virtually all tropical fruit crops, although many scientists focus on the FRUIT rather than the TREE. It is often assumed that the grower knows all there is to know about looking after the tree.

This Agrodok is a general introduction into the subject for gardeners, growers, and those who support them, for instance extension workers. Traditional expertise has been matched with insights gained through research work and the focus is firmly on the TREE, emphasizing:

- clonal propagation of superior varieties,
- methods to restrain shoot growth to ensure better flowering in crops that bear seasonally,
- limiting tree size to facilitate pruning, crop protection, harvesting, etc.

The first three chapters deal with general aspects of fruit growing: 1. Introduction: no flowers, no fruit; importance of trees and fruits; reasons NOT to grow fruit. 2. Cropping systems, from home gardens to corporate plantations; the advantages of small trees. 3. Form and function (the longest chapter): grouping fruit crops according to tree form and relating form to function, resulting in different approaches to crop care for each group.

Chapters 4 - 10 treat different aspects of crop care: propagation, pruning, control over the annual crop cycle, pollination and fruit set, crop protection, harvesting, orchard lay-out. A crop index lists the page numbers where information on a particular crop can be found.

Agrodok 5 is available in English, French and Portuguese editions from AGROMISA, POBox 41, 6700AA, Wageningen and from CTA, POBox 380, 6700 AJ Wageningen, The Netherlands. CTA employs a credit point system, allowing inhabitants of the Third World to order Agrodoks free of charge.

Author	Ed Verheij
Year	2007

### **VIII International Symposium on Temperate Zone Fruits in the Tropics and Subtropics**

The objective of this symposium is to provide a forum for exchange of scientific work between researchers, professors and academics on the whole of temperate fruit production in marginal climate.

Brazil  
Santa Catarina  
October 21-25 2007

Message by Frederic MEURRENS (meurrens\_f@hotmail.com)

### **II ISOFAR Conference on Organic Fruits & 16th IFOAM Organic World Congress**

There will be a separate conference for organic fruit at the 16th IFOAM Organic World Congress(OWC).

This conference is co-organized by the International Society of Horticultural Science ISHS and its commission 'Sustainability through Integrated and Organic Horticulture' CMOR, and takes place on Monday June 16 and Tuesday June 17 at Vignola.

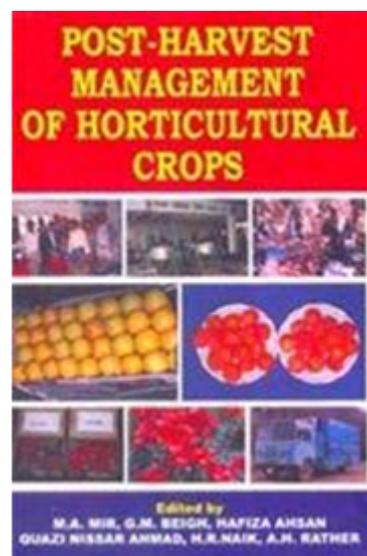
Contributions on any fruit species are welcome, including temperate tree and berry species, Mediterranean species such as olives, and tropical and sub-tropical fruit species. Scientific research papers on organic fruit over the whole chain are possible, including production, post-harvest, marketing, consumer and social topics. The committee is particularly interested in research that has a broad, whole-system, multi-factorial approach.

Country	Italy
Location	Modena
Date	June 16-17 2008

## Post-Harvest Management of Horticultural Crops

India has a rich biodiversity of horticultural crops growing in its varied agro-climatic regions, fruits, vegetables, flowers, ornamentals and spices are perishable in nature and their shelf life is limited, depending upon environmental and handling conditions.

Due to poor Post-Harvest Management Practices, and lack of infrastructure facilities, huge losses (20-40%) occur which cause an annual estimated loss of Rs. 23,000 crores. The subject matter of the book covers Post harvest physiology, Scientific handling, grading and storage methods, Post harvest diseases, Solar/Osmotic dehydration techniques, Food irradiation, Food biotechnology, Food safety and quality assurance (HACCP), and Post harvest technology of species like saffron and kalazeera, Floral dehydration and On-farm agro-processing/value addition techniques from employment generation. The present book provides technical know how of the latest Post-Harvest management/Processing techniques which will have an impact on reduction of post harvest losses in perishable horticultural produce and will lead to sustainable development of our agrarian economy. The aim of the book is to create capacity that would enable safe handling of produce to process, package and transport to remunerative markets so as to minimize post harvest loss and improve net availability of quality saleable produce to consumers and net return to growers. This book is useful to the Food Scientists, Post Harvest technologists, Horticulturalists, Agri-business Entrepreneurs, Supply-Chain Management Professionals, Warehouse Handlers, UG and PG students of Agricultural universities.



Author Qazi Nissar Ahmad (Ed. by), A.H. Rather (Ed. by), Et Al.,

Year 2007



- **From GlobalHort ([www.globalhort.org](http://www.globalhort.org))**

### Awareness Raising Conference on Horticulture for Development 25 June 2007

#### INTRODUCTION

A group of 38 participants from the public, private, NGOs, civic and international organizations, mostly representing Africa, Caribbean and Pacific (ACP) nations, was hosted by the Technical Centre for Agricultural and Rural Cooperation (CTA) at Wageningen in the Netherlands from 21-22 June 2007 to finalize a position paper for presentation at the

Awareness Raising Conference on Horticulture for Development (ARCH) in Brussels on 25 June 2007.

The CTA is an institution serving the interests of ACP countries within the European Union (EU) and advocate strongly for the *Global Horticulture Initiative* (GHI). The need to build awareness for horticulture among European international development agencies was raised during a meeting on September 8, 2006 involving the EC Directorate General for Development and a small group of horticultural leaders. It was recognized that the widely dispersed 'horticulture for development' community had to be better organized and EU support is indeed vital in building institutional capacity for support to horticulture.

Advances in information and communication technologies (ICT) and science provide unprecedented opportunities for the scientific community to take collective action for impact on poverty and malnutrition. The GHI, a consortium of international organizations and agencies already involved in horticultural research and education for development will utilize these advances to enlist a global network to develop programs that will offer economic opportunities and food security for the poor.

A strong horticulture sector is an engine for economic growth, creating jobs, supporting agribusinesses, and generating income to a greater degree than staple crops. Furthermore, horticultural crops can provide the micronutrients that are essential, yet lacking, in the diets of half of the world's population.

The key themes that should be reinforced in the Brussels ARCH meeting on 25 June 2007 were decided during the discussions in the Wageningen meeting. This paper aggregates their thoughts into a single summary statement.

#### KEY THEMES:

- I. *Creation of sustainable employment and wealth creation*
- II. *Food safety, health and nutrition*
- III. *Supportive policies, services and infrastructure*
- IV. *Education, training, outreach and awareness*

#### **I. Creation of sustainable employment and wealth creation**

*Constraints: Through media, Europeans see massive poverty from warfare and conflicts around the globe but an even greater stream of refugees is on the march from rural to urban areas and from developing countries to developed countries due to under- and un-employment. Joblessness prevents heads of households from making a decent earning to support themselves and their families. Life in unsanitary and ungoverned urban slums – regardless of location in the north or the south – is intolerable and degrading, leading to violence, crime, prevalence of drugs and insecurity. With no jobs or a chance for self-respect,*

*family values become degraded and civil society transforms from cohesive communities to lawless seedbeds for intolerance and insurgency.*

How GHI can address the constraints?

Horticulture is labor intensive and has the highest economic returns per unit of effort and square meter of productive area. Not all people in rural areas are farmers – some people are involved in processing and services such as picking, cleaning, packing, transporting, marketing and providing services. The rural non-farm income generated from salaries paid to these people generally stays in the countryside, giving people the money for their basic needs. The aggregation of these individual actions is sometimes called the “multiplier effect”. That is why development can sometimes prosper best when focusing on the middle sized farmer who can develop as an entrepreneur and pull others out of poverty by providing them with jobs.

If horticulture is to reach its potential in supplying jobs it will need to organize farmers to produce what sells, delivering the product in the right quality and quantity and at the right times to supply the global food chain. This is easier said than done. Using farmer associations it will be possible to provide the essential specific information on seed and fertilizer inputs, organic or traditional production recommendations, plant protection, market information, standards of quality, certification schemes and post-harvest processing.

GHI effort will work on both domestic and export production; however, we recognize that meeting export standards will also improve domestic standards and infrastructure; while focus on the domestic market should decrease waste, encourage sustainable agricultural practices and assure affordable availability of high value crops for local communities.

Public-private partnerships are certainly part of a successful formula. The public sector is mostly ill-equipped to provide the necessary information for survival in a commercial marketplace. The consolidation now taking place in the fruit and vegetable commodity markets will make it difficult for small producers to feed into a value chain because of bigger middlemen who are buying ever greater quantities.

The private sector should be encouraged to help farmers improve efficiency through contract farming arrangements. Some responsibility can be born by the public sector that includes providing information, monitoring of fair trade practices and organizational assistance to farmers that would otherwise not be able to keep up with the demands of the private sector.

## **II. Food safety, health and nutrition**

*Constraints: In general, the high value crops will bring better nutrition to the population – especially women and children – than commodity crops. A comprehensive description of potential opportunities and constraints for high value crops in each country is needed to inform all stakeholders and to identify the value capturing role of women in the process. The*

*horticultural sector in developing countries is mainly run by women and empowerment of women leads to better family health and education.*

How GHI can address the constraints?

GHI envisages very specific activities and outcomes that will contribute to improve incomes and life quality of smallholder producers: (a) improved diet and health of farm families and farming communities through reliable production and consumption of fruits and vegetables; (b) introducing varieties and cultivars with high nutrient content; (c) ensuring food safety through improvements to the horticultural value chain, (d) improved incomes of smallholder farmers and rural communities by diversifying agricultural systems to include high value horticultural crops and (e) achieving production levels of horticultural crops that exceed family requirements. Finally, as in developed countries, we need to get the “junk food” out of the schools.

Some simple things can be done to exploit existing opportunities or to fill information gaps. For example, organic agricultural production is a *de facto* condition in many low input systems and certification and monitoring schemes would have the dual purpose of maintaining organic standards but also quantify the quality and level of contaminants in fruits and vegetables produced. Technology transfer of newly bred varieties with a better composition of essential amino acids, vitamins, minerals and co-factors needed for proper human physiological functions would be important contributions to farming systems and communities in the target regions.

### **III. Supportive policies, services and infrastructure**

*Constraints: Unless the proper policy environment is in place to foster the growth of the horticulture sector, much of the effort will not bear fruit. The World Bank has developed an agricultural business plan for one of its regions that states it will concentrate support for supply chain development where there is a clear government interest in strengthening the incentives for private participation. Indicators of commitment include price reform, trade liberalisation, the withdrawal of the state from marketing, and the establishment of governance arrangements for producers' associations and public agricultural services that will make them more responsive to private operators' priorities.*

*Some argue that rural zones are dynamic, competitive and modernizing. Others respond that rural societies, with their agrarian political structures, low productivity, protectionism and subsidies, are a burden on the rest of the economy. In reality, both things are happening at the same time -- the countryside a cauldron of pressing social concerns but also a launching pad for a potential world-class high-value export sector. This dualism is at the core of the rural policy dilemma faced by many governments.*

How GHI can address the constraints?

Policy reform is not limited to developing countries. Developing products must reach markets and there are too many standards, they are too complicated and demand different things. An international public good would be to disentangle and harmonize this multiplicity of standards. The current situation adds considerably to costs because no single standard is universally acceptable, forcing a duplication of certification.

National programs are just starting to mainstream business development services (BDS). Donors are increasingly aware of the need for record keeping, accounting and financial planning. For example, BDS could focus on: (1) product assembly and grading services, (2) quality assurance services; (3) access to material inputs; (4) business skills; (5) appropriate technology; (6) establishment of labels and other promotional information; (7) research and development; and/or (8) financial brokering.

Horticulture requires intensive infrastructure support – i.e. high costs of inputs; set up infrastructure required to foster good quality of inputs; support to market research. More attention should be given to cost benefit ratios and time needed to break even on fruit tree cultures that might be advantageous in developing countries. Governments need to develop long-term vision based on sound analyses and judgments combined with risk avoiding strategies that diversity farming systems.

Reallocation of funds for research was a frequently heard lament during the course of the discussion. Propping up cereal prices and subsidized water for commodity crop production can block out opportunities to explore new and possibly more efficient and profitable ways of structuring agricultural production. New thinking will be needed to free up funds for transportation infrastructure that will single-handedly contribute to significantly reducing crop losses due to inadequate handling and transport.

#### **IV. Education, training, outreach and awareness**

*Constraints: Imagine trying to do business without a market information system to present the choices; an extension system that could explain the regulations; a record keeping system to track costs, profits or loss; or educational and research institutions to produce future generations of horticulturists. Making the public aware of these production and marketing chains can make the difference between success and failure – bringing the product to that attention of the public and setting off trends that send niche crops from obscurity to common household names.*

How GHI can address the constraints?

Horticulture is very knowledge intensive and dynamic. Lack of human, institutional, and research capacity inhibits innovation, technology adoption, and the development of solutions to address key constraints. The development of participatory methodologies and effective education and extension networks, involving public, private, and civic sector collaboration,

will strengthen the technical capacity of horticultural producers and improve the efficiency of current production and marketing systems.

In our global food chain, courses and faculty need to modernize and become more market-driven. To get jobs in the private sector and to be a part of this emerging food system, graduates need additional skills like problem-solving and decision-making skills, regardless of whether they are in technical or managerial positions. Courses and curricula need to be reformed.

This level of education needs strengthening through local schools and via distance education in developing so called graduate farmers. With this capacity, the farming community can move quickly in getting organized into groups, seeking markets and securing the latest technology. Nearly all agricultural extension workers were trained for a supply driven extension system but know very little about market development, high value crops or organizing farmers into groups and linking them to supply chains. By organizing farmers into groups then linking these groups to markets will: (a) achieve economies of scale; (b) strengthen the position of farmers in dealing with traders and processors; and (c) organize rural women as self-help groups, first into specialized horticulture groups and then into farmer associations, putting more food on the plate and in getting more girls into schools.



**- From the CGIAR :**

## **Interest Group Meeting on High Value Fruits Research [Congruent with CGIAR System Priority 3A]**

**Nairobi, 6 June 2007**

### **Objectives:**

- 1. Share key on-going research activities to identify knowledge gaps and research issues that are amenable to, and urgently require, collaborative research projects.**
- 2. Prioritize researchable issues needing to be addressed to create viable fruit industries in developing countries (the goal to achieve the high-value crop vision).**
  - input into CP pre-proposal development**
- 3. Set up a mechanism(s) (interest group, network, website, etc.) to organize and manage fruit research**
  - e-discussions, research and policy workshops, conferences and forums, and other forms of knowledge exchange to promote fruit research.**
- 4. Organize to pursue funding opportunities from various sources for joint research for development activities.**

### Way forward – mechanisms to promote partnership

Mechanism(s) (community of practice, network, consortium)

#### Outcome – Community of Practice

- Objective – promote/share/facilitate knowledge sharing and partnership in fruit research.
- Convened by Global Horticulture Initiative (GlobHort).
- Mechanism – virtual sharing via partner list server, linking of partner websites, etc.
- Outcome-oriented research theme and funding proposal development – convening institutions to be chosen after CP pre-proposal meeting.



### - From CIRAD

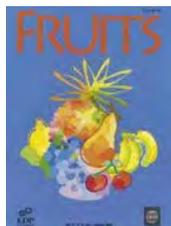
The website on Tropical fruits in the Caribbean is updated :

<http://caribfruits.cirad.fr>

Discover the richness of our collections, with more than 200 varieties.

The fruit diversity of the French West Indies covers more than 125 species: 8 % are wild and indigenous from the Caribbean, 24 % are wild introduced and 68 % are cultivated...

### *Publications*



- Scientific journals : FRUITS

**Editorial published online: 19 September 2007): Knowing how to anticipate risks in order to manage them better.... Dr. Jacky Ganry**

Fifty years ago, an article by A. Comelli appeared in the *Fruits* journal, concerning "*Citrus Tristeza in French Equatorial Africa*" (see the column *Read in Fruits, 50 years ago* in this same issue). The author reported there the very first cases of citrus Tristeza detected in central Africa. A sentence particularly attracted my interest because it can be regarded as very anticipatory of the current period: "*A more serious consequence of this situation is the danger that it represents for North Africa... in spite of the screen that the Sahara represents*". Indeed, the number of diseases and pests currently present in sub-Saharan Africa, where they already constitute a major constraint, represents a very strong threat for North Africa and Europe, the more so as the process of climate change, already started, amplified by increasing flows of people and goods related to the globalisation of exchanges, can only feed these main risks.

Just as citrus Tristeza is now strongly present in North Africa, in Spain, and was very recently detected in Italy, it is to be feared that, in less than fifty years, diseases such as Huanglongbin (HLB), or citrus greening, will also have reached all these areas where citrus cultivation represents an important component of the agriculture and economy. However, it is pertinently known that the disease is already present in several African areas and that its vectors are present in Iran and in Madeira!

Faced with this threat, research work is almost non-existent in this part of the world, whereas, where the disease is present, the focus is especially put on the eradication of the affected trees or on the polluting and not very efficient chemical control against the psylla vector.

Having arrived very recently in Brazil and Florida, it constitutes there a very worrying handicap for the citrus industry.

Will we have to wait until it arrives in North Africa or Spain to finally become aware of the extent of the problem? It will then be too late and it will be necessary to put emphasis on emergency measures as in Vietnam, Brazil or Florida.

We plead for real research programs to be developed, making it possible to prevent such a plague, while being based on scientific arguments which makes it possible to reconcile effectiveness and production with safety and respect for the environment. We could thus at the same time anticipate the risks in the threatened zones, like Europe, and bring solutions to the developing countries of Africa or Asia where the disease already exists.

HLB constitutes an example among others.

Let us not wait until the pest and disease constraints become catastrophes to try to treat them after a fashion with exorbitant economic and environmental costs. Let us anticipate the plant health risks in order to manage them better.

It is important that research organizations, like those which support them, can be fully aware of it simply while using the experience of the past. Citrus Tristeza constitutes a very good example of this.

*IFAVA's news*



## **Fruits & Vegetables and Health: A Scientific Overview**

### LITERATURE REVIEW - EXECUTIVE SUMMARY

The scientific evidence for the health benefits of fruit and vegetable consumption continues to expand. The extensive literature characterizing the phytochemicals and other bioactive components in fruits and vegetables reflect advances in science and technology that have made it possible to identify how these agents might affect biological processes using more accurate and sophisticated endpoints.

This review provides an overview of recent studies related to fruit and vegetable consumption and health, with an emphasis on investigations of whole food sources. The goal of the review is to evaluate a potential independent effect of collective intake of fruits or vegetables or a combination of both. Individual fruits and vegetables are highlighted only if they emerged as statistically significant in analysis. Data for the review is based on peer-reviewed articles between January, 2002 and August, 2006, and included only human studies. The topics in this review are those for which the scientific literature is relatively small. In 2005, the World Health Organization published reviews on Dietary intake of fruits and vegetables and management of

body weight ([http://www.who.int/dietphysicalactivity/publications/f&v\\_weight\\_management.pdf](http://www.who.int/dietphysicalactivity/publications/f&v_weight_management.pdf)), and on Dietary intake of fruits and vegetables and risk of diabetes and cardiovascular diseases ([http://www.who.int/dietphysicalactivity/publications/f&v\\_cvd\\_diabetes.pdf](http://www.who.int/dietphysicalactivity/publications/f&v_cvd_diabetes.pdf)). The World Cancer Research Fund is reviewing the literature on diet and cancer, including fruits and vegetables, which will be published in 2007.

A variety of studies have been conducted to examine the relationship between fruit and vegetable intake, health promotion and disease prevention. Studies conducted in the past 5 years add to earlier work suggesting that fruits and vegetables appear to have health-promoting properties. Many of the studies reported during this time have focused on investigating mechanisms and understanding the bioactive compounds in these foods. The majority of evidence linking fruit and vegetable intake to health continues to be observational and data is often conflicting.

Review of the literature on pulmonary health suggests a plausible positive relationship with fruit and vegetable intake. For Chronic Obstructive Pulmonary Disease (COPD), the evidence is suggestive of a positive relationship, based on a few human studies. The literature on asthma, both in children and adults is relatively small, but growing, and the preliminary results indicate a 'watching' status for potential relationships. Although studies have controlled for potential confounders, the studies and their results are subject to inconsistencies.

The literature on fruit and vegetable intake and bone health continues to grow, and results of recent studies suggest a plausible positive relationship, especially mechanistic studies. However, there are very few clinical trials to confirm cause and effect.

The variety of processes associated with aging and amplified in neurodegenerative diseases of aging are complex and not completely understood. Available data on aging and cognition warrant continued 'watching', and data related to fruit and vegetable intake and neurodegenerative diseases indicate a plausible relationship, suggesting the potential of fruits and vegetables to modulate some of these processes. Extensive work remains to be done.

Available data relating fruit and vegetable intake to cataracts and eye health is primarily observational. However, the results of these few human studies are suggestive of a moderate effect. Further study is clearly warranted, especially clinical intervention trials.

There are possible mechanisms for a protective effect of fruits and vegetables related to inflammatory and oxidative processes associated with onset of arthritis. Results of studies suggest the relationship between fruit and vegetable intake and improvement in risk or prognosis of arthritis is plausible. However, not all antioxidants found in fruits and vegetables or total intake emerge consistently as protective. Much more work is needed in this area.

While there have been no recent intervention or prospective trials on fruit and vegetable consumption and diverticulosis, a high fiber diet that includes ample quantities of both remains an important aspect of therapy, based on a convincing relationship shown by the literature.

Finally, in the area of birth defects, the majority of data shows a convincing protective effect of folate from supplements and not from natural folate intake. However, a number of studies demonstrate the importance of fruit and vegetable intake on plasma folate levels suggesting their potential contribution to reducing birth defects.

There is clearly a need for controlled, clinical intervention trials in order to confirm that consumption of fruits and vegetables promotes health and reduces risk of disease. Accurate assessment of dietary intake remains difficult, and cost-efficient methods to estimate intake more precisely are needed. Consistent use of appropriate endpoints and methodologies will also help to clarify potential relationship. More mechanistic studies will enable characterization of the components and processes that mediate protective effects in humans.

## **Preventing Chronic Diseases - New WHO report**

Thursday, October 05, 2006

WHO proposes a new global goal: to reduce the projected trend of chronic disease death rates by 2% each year until 2015. This would prevent 36 million people dying

Preventing Chronic Diseases: a vital investment

WHO launched this new report. WHO stresses that the global epidemic of chronic disease can be stopped. It is projected that around 17 million people die prematurely each year from chronic disease. The economic consequences are also significant, with countries forgoing billions of dollars over a decade as a result of heart disease, stroke, cancer and diabetes.

Dr Robert Beaglehole, WHO Director, Chronic Diseases and Health Promotion said that the real tragedy is that more hasn't been done to avoid this epidemic, as overweight and obesity, and their related chronic diseases, are largely preventable. Approximately 80% of heart disease, stroke, and type 2 diabetes, and 40% of cancer could be avoided through healthy diet, regular physical activity and avoidance of tobacco use".

### **New goal and partnerships**

WHO proposes a new global goal: to reduce the projected trend of chronic disease death rates by 2% each year until 2015. This would prevent 36 million people dying of chronic diseases in the next 10 years, nearly half of them before they turn 70.

But these problems and their solutions lie outside the control of any one sector. In order to achieve the goal, all sectors from government, private industry, civil society and communities will have to work together.

"More and more people are dying too early and suffering too long from chronic diseases," said Dr.

Catherine le Galès-Camus, Assistant Director-General of Non-communicable Diseases and Mental Health, "We know what to do, and so we must do it now".

### **The stepwise framework**

In this report the stepwise framework is introduced. The stepwise framework offers a flexible and practical approach to assist ministries of health in balancing diverse needs and priorities while implementing evidence-based interventions. Partnerships among various groups, organizations and sectors are according to this report indispensable.

### **400 million people**

Dr Catherine Le Galès-Camus, WHO Assistant Director-General for Non-communicable Diseases and Mental Health said that without action, almost 400 million people will die from chronic diseases in the next 10 years. Many of these deaths will occur prematurely, affecting families, communities and countries alike".

The Governments of Canada, Norway, and the United Kingdom supported the the production 'Preventing Chronic Diseases: a vital investment'.

## *Meetings*

### **ISHS symposiums:**

#### **- From SETF Section :**

- October 22-26, 2007, João Pessoa - Paraíba (Brazil): VI International Congress on Cactus Pear and Cochineal and the VI General Meeting of FAO-CACTUSNET. Info: Juliana Rossignol, FAO CACTUSNET, Cactus Pear Symposium Secretariat, João Pessoa, Paraíba, Brazil. Phone: (55)8332225144, E-mail: [congressopalma@senarpb.com.br](mailto:congressopalma@senarpb.com.br) or Dr. Albericio Pereira de Andrade, R. Nilton Etilac Leal, 1189, Alto Branco, CEP 58102-485, Campina Grande, PB, Brazil. Web: <http://www.cactuspearcongress2007.com>

- **N** November 18-23, 2007, João Pessoa, Paraíba (Brazil): **VI International Pineapple Symposium**. Info: Dr. Domingo Haroldo Reinhardt, Embrapa Cassava & Tropical Fruits, Caixa Postal 7, 44380-000 Cruz das Almas, BA, Brazil. Phone: (55) 75 3621 8002, Fax: (55) 75 3621 8097, E-mail: [dharoldo@cnpmf.embrapa.br](mailto:dharoldo@cnpmf.embrapa.br) Web: <http://www.ipsbrasil2007.com.br>

## Year 2008

- August 25-28, 2008, Fuzhou - Fujian Province (China): **III International Symposium on Longan, Lychee and other Fruit Trees in Sapindaceae**. Info: Prof. Dr. Pan Dong-Ming, College of Horticulture, Fujian Agric & Forestry University, Dept. Of Horticulture, Fuzhou, Fujian Province, China. Phone: (86)59183789299, Fax: (86)59183735681, E-mail: [pdm666@126.com](mailto:pdm666@126.com)
- September 21-25, 2008, Baoding (China): **I International Jujube Symposium**. Info: Prof. Dr. Mengjun Liu, Research Center of Chinese Jujube, Agricultural University of Hebei, Baoding, Hebei, 71001, China. Phone: (86)312754342, Fax: (86)3127521251, E-mail: [kjliu@hebau.edu.cn](mailto:kjliu@hebau.edu.cn)
- November 3-7, 2008, Bogor (Indonesia): **IV International Symposium on Tropical and Subtropical Fruits**. Info: Dr. Roedhy Poerwanto, Jl. Abiyasa Raya No. 1, Bantarjati, 16143 Bogor, Indonesia. Phone: (62)251328942, Fax: (62)251326881, E-mail: [roedhy@indo.net.id](mailto:roedhy@indo.net.id)
- November 8-13, 2008, Firenze, Faenza and Caserta (Italy): **IV International Symposium on Persimmon**. Info: Prof. Dr. Elvio Bellini, University of Firenze, Horticultural Department, Viale delle idee 30, 50019 Sesto Fiorentino, Italy. Phone: (39)0554574053, Fax: (39)0554574017, E-mail: [elvio.bellini@unifi.it](mailto:elvio.bellini@unifi.it) or Dr. Edgardo Giordani, Department of Horticulture, University of Florence, Viale delle Idee 30, 50019 Sesto Fiorentino (FI), Italy. Phone: (39)0 55 4574050, Fax: (39)0 55 4574017, E-mail: [edgardo.giordani@unifi.it](mailto:edgardo.giordani@unifi.it) Web: <http://www.4persimmon2008.it>
- **NEW** November 10-13, 2008, Mérida (Mexico): **II International Symposium on Guava and other Myrtaceae**. Info: Dr. Wolfgang Rohde, MPIZ, Calf-von-Linné-Weg 10, 50829 Koeln, Germany. Phone: (49)2215062101, Fax: (49)2215062113, E-mail: [rohde@mpiz-koeln.mpg.de](mailto:rohde@mpiz-koeln.mpg.de) or Dr. Jose Saul Padilla Ramirez, INIFAP-Campo Experimental Pabellon, Km. 32,5 Carr. Aguascalientes-Zacatecas, Apdo Postal No. 20 CP 20660, Pabellon de Arteaga, Aguascalientes, Mexico. Phone: (52)4659580167, Fax: (52)4659580167
- **NEW** December 9-12, 2008, Madurai, Tamil Nadu (India): **II International Symposium on Papaya**. Info: Dr. N. Kumar, Department of Fruit Crops, Horticultural College & Research Institute, Priyakulam, 625 604, India. Phone: (91)4546231726, Fax: (91)4546231726, E-mail: [kumarhort@yahoo.com](mailto:kumarhort@yahoo.com) Web: <http://www.ishs-papaya2008.com/>

## **- From other ISHS Commissions and Sections, but relevant for SETF**

- November 11-13, 2007, Ravensburg (Germany): **COST-ISHS Workshop on Ripening Regulation and Postharvest Fruit Quality**. Info: Mr. Roy McCormick, Köpfchenstrasse 12, 57072 Siegen, Germany. Phone: (49)2712501651, E-mail: [roy.fionn@t-online.de](mailto:roy.fionn@t-online.de) or Dr. Josef Streif, Institut Fuer Obstbau, Bavendorf, 88213 Ravensburg, Germany. Phone: (49)7517903325, Fax: (49)7517903322
- December 3-6, 2007, Bangkok (Thailand): **Europe-Asia Symposium on Quality Management in Postharvest Systems (EURASIA2007)**. Info: Dr. Sirichai Kanlayanarat, King Mongkut's University, Division of Postharvest Technology, 91 Prachautit, 10140 Thungkru, Bangkok, Thailand. Phone: (66)2 470 9796, Fax: (66)2 452 3750, E-mail: [sirichai.kan@kmutt.ac.th](mailto:sirichai.kan@kmutt.ac.th) Web: <http://www.kmutt.ac.th/EURASIA2007>

### Year 2008

- January 6-9, 2008, Orlando, FL (United States of America): **International Symposium Application of Precision Agriculture for Fruits and Vegetables**. Info: Dr. Reza Ehsani, University of Florida, Citrus Research and Education Ctr., 700 Experiment Station Rd., Lake Alfred, FL 33850, United States of America. Phone: (1)8639561151 ext 1228, Fax: (1)8639564631, E-mail: [ehsani@ufl.edu](mailto:ehsani@ufl.edu) or Prof. L. Gene Albrigo, 7 Winterset Drive, Winter Haven, FL 33884, United States of America. Phone: (1)8633244942, Fax: (1)8639564631 Web: <http://www.precisionag2008.com>
- March 3-7, 2008, Huelva (Spain): **VI International Strawberry Symposium**. Info: Dr. José Lopez Medina, Dpto. Ciencias Agroforestales, Escuela Politécnica Superior, Campus La Rabida, Univ.Huelva, 21819 Palos de la Frontera - Huelva, Spain. Phone: (34)959217522, Fax: (34)959350311, E-mail: [medina@uhu.es](mailto:medina@uhu.es) Web: <http://www.iss2008spain.com>
- March 3-7, 2008, Arusha (Tanzania): **I International Symposium on Underutilized Plant Species**. Info: Dr. Hannah Jaenicke, Director, International Centre for Underutilised Crops, PO Box 2075, Colombo, Sri Lanka. Phone: (94)112787404ext3307, Fax: (94)112786854, E-mail: [h.jaenicke@cgiar.org](mailto:h.jaenicke@cgiar.org) or Dr. Irmgard Hoeschle-Zeledon, GFU Underutilized Species, Via dei Tre Denari, 472/a, 00057 Maccarese, Rome, Italy. Phone: (39)06-6118-292, Fax: (39)06-61979661 Web: <http://www.icuc-iwmi.org/Symposium2008/>
- May 19-21, 2008, Faro (Portugal): **VI International Symposium on Mineral Nutrition of Fruit Crops**. Info: Prof. Dr. Pedro José Correia, Universidade do Algarve, FERN,, Campus de

Gambelas, 8005-139 Faro, Portugal. Phone: (351)289800900, Fax: (351)289-818419, E-mail: [pcorreia@ualg.pt](mailto:pcorreia@ualg.pt) or Maribela Pestana, Universidade do Algarve, FERN,, Campus de Gambelas, 8005-139 Faro, Portugal. Phone: (351)289-800900, Fax: (351)289-818419, E-mail: [fpestana@ualg.pt](mailto:fpestana@ualg.pt) Web: <http://eventos.ualg.pt/mnutrition6>

- June 16-17, 2008, Vignola, Modena (Italy): **II ISOFAR Conference on Organic Fruits & 16th IFOAM Organic World Congress**. Info: Dr. Franco Weibel, Res. Institute for Organic Farming, FIBL, Ackerstrasse, 5070 Frick, Switzerland. Phone: (41)628657272, Fax: (41)628657273, E-mail: [franco.weibel@fibl.ch](mailto:franco.weibel@fibl.ch) or Dr. Robert K. Prange, Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, 32 Main Street, Kentville, NS B4N 1J5, Canada. Phone: (1)9026795713, Fax: (1)9026792311, E-mail: [pranger@agr.gc.ca](mailto:pranger@agr.gc.ca) Web: <http://www.isofar.org/modena2008/fruit.html>
- **NEW** August 4-8, 2008, Geneva, NY (United States of America): **IX International Symposium on Integrating Canopy, Rootstock and Environmental Physiology in Orchard Systems**. Info: Dr. Terence L. Robinson, Dept. Horticultural Science, 630 W. North Street, Geneva, NY 14456, United States of America. Phone: (1)315-787-2227, Fax: (1)315-787-2216, E-mail: [tlr1@cornell.edu](mailto:tlr1@cornell.edu)
- September 1-5, 2008, Dresden, Pillnitz (Germany): **I International Symposium on Biotechnology of Fruit Species**. Info: Dr. Viola Hanke, Bafz, Institute for Fruit Breeding, Pillnitzer Platz 3a, 01326 Dresden, Germany. Phone: (49)3512.616.214, Fax: (49)3512.616.213, E-mail: [v.hanke@bafz.de](mailto:v.hanke@bafz.de) Web: <http://www.biotechfruit2008.bafz.de>
- **NEW** October 22-24, 2008, Sevilla (Spain): **VII International Workshop on Sap Flow**. Info: Dr. José Enrique Fernandez, Inst. de Rec. Nat.y Agrobiol., Campus de Reina Mercedes, Apartado 1052, 41080 Sevilla, Spain. Phone: (34)954624711, Fax: (34)954624002, E-mail: [jefer@irnase.csic.es](mailto:jefer@irnase.csic.es)
- December 7-11, 2008, Chiang Mai (Thailand): **XVI International Symposium on Horticultural Economics and Management**. Info: Peter J. Batt, Horticulture, Curtin University of Technology, GPO box U1987, Perth, WA 6845, Australia. Phone: (61)8 9266 7596, Fax: (61)8 9266 3063, E-mail: [p.batt@curtin.edu.au](mailto:p.batt@curtin.edu.au) or Prof. Dr. Peter P. Oppenheim, Deakin Business School, Deakin University, 336 Glenferrie Road, Malvern, VIC 3144, Australia. Phone: (61)3 9244 5549, Fax: (61)3 9244 5040 Web: <http://www.muresk.curtin.edu.au/conference/ishsem>
- December 7-13, 2008, Bangalore (India): **IX International Symposium on Acclimatization and Establishment of Micropropagated Plants**. Info: Dr. Jitendra Prakash, In Vitro International Pvt. Ltd., #12/44, Rajiv Gandhi Nagar, Bommanahalli, Bangalore 560 068, India. Phone: (91)80 41109273, Fax: (91)80 25727030, E-mail: [invitro@bgl.vsnl.net.in](mailto:invitro@bgl.vsnl.net.in)

- December 7-11, 2008, Chiang Mai (Thailand): V International Symposium on Horticultural Research, Training and Extension. Info: Peter J. Batt, Horticulture, Curtin University of Technology, GPO box U1987, Perth, WA 6845, Australia. Phone: (61)8 9266 7596, Fax: (61)8 9266 3063, E-mail: [p.batt@curtin.edu.au](mailto:p.batt@curtin.edu.au) or Associate Professor Dr. David Aldous, University of Melbourne, Burnley College, Swan Street, Richmond VIC 3121, Australia. Phone: (61)0392506800, Fax: (61)0392506885 Web: <http://www.muresk.curtin.edu.au/conference/ishset>

## Year 2009

- September - , 2009, Bologna (Italy): XI International Symposium on Plant Bioregulators in Fruit Production. Info: Prof. Guglielmo Costa, Ordinario di Arboricoltura Generale, Dipartimento di Colture Arboree, Via G. Fanin 46, 40127 Bologna, Italy. Phone: (39)051 20 9 6443, Fax: (39)051 20 9 6401, E-mail: [guglielmo.costa@unibo.it](mailto:guglielmo.costa@unibo.it)

