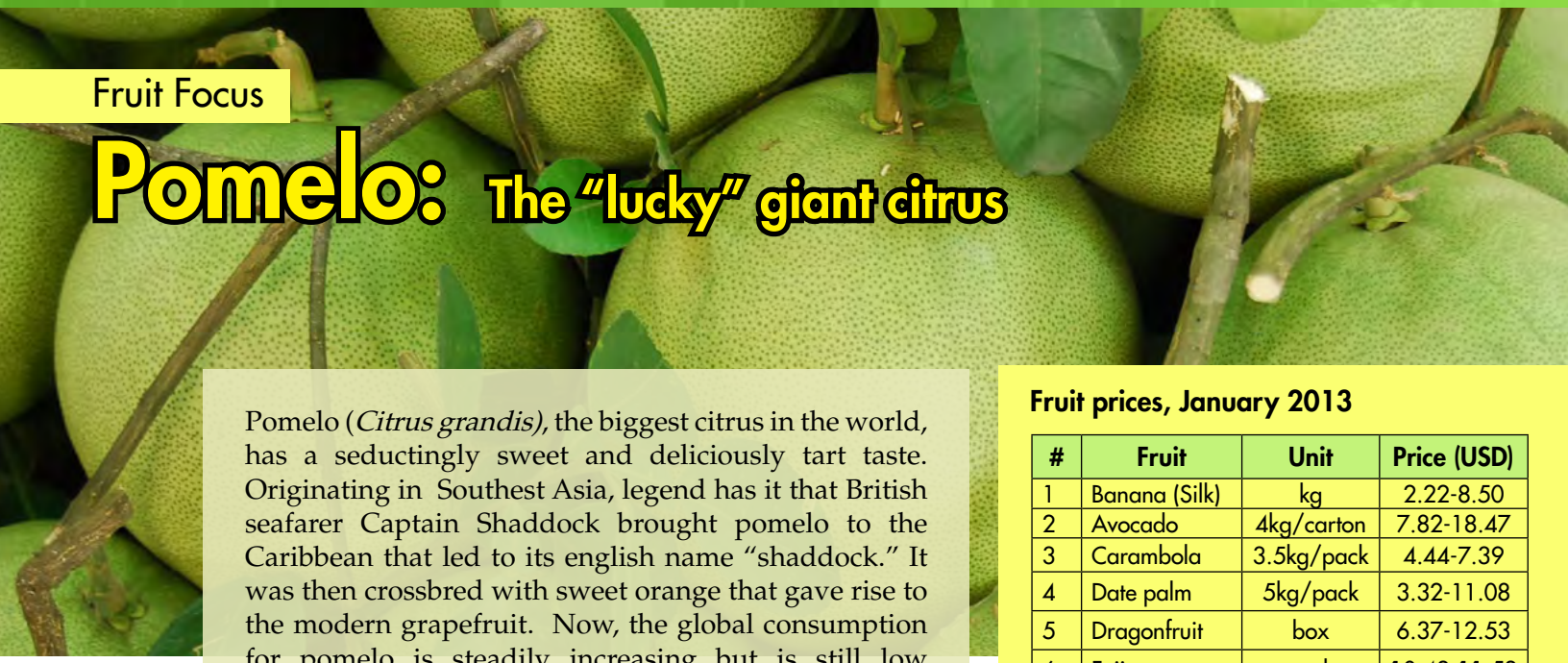
January-February 2013

# tropical fruit net

*Your Global Partner in Tropical Fruit Development*

Newsletter of the International Tropical Fruits Network (TFNet)

www.itfnet.org



Fruit Focus

## Pomelo: The "lucky" giant citrus

Pomelo (*Citrus grandis)*, the biggest citrus in the world, has a seductingly sweet and deliciously tart taste. Originating in Southest Asia, legend has it that British seafarer Captain Shaddock brought pomelo to the Caribbean that led to its english name "shaddock." It was then crossbred with sweet orange that gave rise to the modern grapefruit. Now, the global consumption for pomelo is steadily increasing but is still low compared to other major citruses.

Pomelo is native to Southeast Asia and is now grown in countries including Malaysia, Indonesia, China, Japan, India, Fiji, Philippines, Vietnam, and Thailand. Since its introduction to China around 100 B.C., pomelo has been cultivated as a traditional fruit crop for the Lunar New Year.

### Plant Description

The pomelo tree reaches 5-15 m tall, with a 10-30 cm crooked trunk. Its branches are low, irregular and densely soft, which are short when young. More than 70% the roots are in the top meter of soil. Leaves are compound and grow alternately with an elliptic shape. Like other citruses, the off-white large flowers are fragrant and single. In optimal conditions, pomelo bears flowers 4 times a year.

### Fruit Description

Pomelo is the biggest citrus fruit, reaching 10-30 cm wide and weighing 1-3 kg. It can be nearly round, oblate, or pear-shaped.

*more on page 14*

### Fruit prices, January 2013

| # | Fruit | Unit | Price (USD) |
|---|---|---|---|
| 1 | Banana (Silk) | kg | 2.22-8.50 |
| 2 | Avocado | 4kg/carton | 7.82-18.47 |
| 3 | Carambola | 3.5kg/pack | 4.44-7.39 |
| 4 | Date palm | 5kg/pack | 3.32-11.08 |
| 5 | Dragonfruit | box | 6.37-12.53 |
| 6 | Feijoa | pack | 10.43-11.53 |
| 7 | Fig | carton | 10.55-13.20 |
| 8 | Granadilla | 2kg/pack | 11.08-12.38 |
| 9 | Guava | 3kg/pack | 7.82-9.45 |
| 10 | Jackfruit | 10kg/pack | 6.52-7.00 |
| 12 | Persimmon | 2.5kg/pack | 2.75-4.20 |
| 13 | Kumquat | 2kg/pack | 3.78-12.39 |
| 14 | Lime | 4kg/pack | 2.03-6.13 |
| 15 | Lychee | 2kg/pack | 1.69-3.91 |
| 16 | Mango | 4kg/pack | 0.78-5.47 |
| 17 | Mangosteen | 2kg/pack | 9.77-12.38 |
| 18 | Melon | 5kg/pack | 1.04-2.61 |
| 19 | Papaya | 3.5kg/pack | 2.45-5.33 |
| 20 | Passion Fruit | 2kg/pack | 5.43-11.73 |
| 21 | Physalis | 12x100g | 7.60-14.69 |
| 22 | Pineapple | pack | 1.24-21.61 |
| 23 | Plantain | box | 1.28-2.48 |
| 24 | Pomegranate | 4kg/pack | 2.40-5.33 |
| 25 | Rambutan | 2kg/pack | 8.08-13.36 |
| 26 | Sapodilla | box | 8.75 |
| 27 | Tamarillo | 2.5kg/pack | 8.60-11.81 |
| 28 | Tamarind | 20x500g | 3.91-5.21 |
| 29 | Ugli Fruit | pack | 2.16 |

Source: International Trade Center (www.intracen.org)

# Editorial

This issue reports the activities of TFNet during the last 3 months of 2012 and the beginning of 2013. In October 2012, TFNet and the Bureau of Plant Industry, Philippines conducted a workshop on the value chain of minor tropical fruits in Davao City, Mindanao. TFNet was also involved as co-organisers with Bangladesh Agricultural University on the 1st International Jackfruit Symposium, which was held in Mymensingh, Bangladesh. Besides this, a workshop on the impact of jackfruit diseases on minimal processing and exports was organised in Malaysia for all stakeholders involved in Research and Development, production, market, and export of the fruit. In enhancing collaboration with network partners and strengthening TFNet's role in global agricultural development, discussions were held with the Arab Organisation for Agricultural Development (AOAD), African-Asian Rural Development Organisation (AARDO) and Center on Integrated Rural Development for Asia and the Pacific (CIRDAP). Following this, activities in 2013 include a workshop on tropical fruit value chain in Kharthoum, Sudan with AOAD, a joint conference with AARDO, and a joint workshop with CIRDAP.

The focus fruit for this issue is the pomelo, and other articles of interest include the export of minimally-processed durian, growing melons using oil palm mill waste, and growing tropical fruits in Sub-Saharan Sudan.

Major events for TFNet this year are a Symposium on Superfruit: Myth or Truth and the TFNet Board Meeting, both of which will be held in Ho Chi Minh City, Vietnam in July 2013.

All are welcome to participate in the Symposium on Superfruits.

## TFNet Member Countries

- Malaysia
- The Republic of Fiji Islands
- The People's Republic of China
- The Syrian Arab Republic
- Federal Republic of Nigeria
- Republic of Indonesia
- People's Republic of Bangladesh
- Republic of the Philippines
- Republic of India
- Republic of Sudan
- The Socialist Republic of Vietnam
- Commonwealth of Australia


## Editorial

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**Tropical fruit net** is a bimonthly newsletter published by the International Tropical Fruits Network (TFNet).

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## Inside the Newsletter



# TFNet Events for 2013

**International Symposium on Superfruits: Myth or Truth?**
Ho Chi Minh City, Vietnam
1-2 July 2013

**TFNet Board of Trustees Meeting**
Ho Chi Minh City, Vietnam
3-4 July 2013

**Workshop in Tropical Fruit Value Chain Improvement for Market Access**
Khartoum, Sudan
20-21 August 2013

**Workshop in Fiji**
3rd quarter, 2013

**Workshop in South America**
3rd quarter, 2013

## Other Related Events

**2nd International Symposium on Discovery and Development of Innovative Strategies for Postharvest Disease Management**
Kusadasi, Turkey
29 April - 2 May 2013
http://www.pdm2013.org

**10th International Mango Symposium**
Punta Cana, Dominican Republic
3-7 June 2013
http://www.cedaf.org.do/eventos/xmango2013/en/index_en.html

**International Symposium on Quality Management of Fruits and Vegetables for Human Health**
Bangkok, Thailand
5-8 August 2013
www.kmutt.ac.th/FVHH2013

**International Symposium on Botanical Gardens and Landscapes**
Bangkok, Thailand
5-8 August 2013
www.kmutt.ac.th/BGL2013

**Asia Fruit Logistica**
Hongkong, China
4-6 September 2013
www.asiafruitlogistica.com

**Southeast Asia Symposium on Quality Management in Postharvest Systems**
Bangkok, Thailand
4-6 December 2013
www.kmutt.ac.th/SEAsia2013


What exactly is meant by "superfruit"? Is a fruit "super" because it is packed with nutrients? Is this a scientific fact? Or is "super" only a promotional catch-phrase used to increase sales?

The term "superfruit" has gained significant attention and is used extensively to promote the health benefits of less popular fruits, such as pomegranates, cranberries and açaí berries. The term "super" refers to the level of antioxidants, as measured by the oxygen radical absorbance capacity (ORAC). Hence, at what ORAC level can a fruit be considered "super"? And what about fruits like passionfruit, papaya, avocado, pineapple, and dragonfruit which are laden with fibres and phytochemicals that are beneficial to health and well-being? Are they not "super", too?

While most people associate superfruit with properties that benefit human health, scientists and nutritionists have differing points of view on the use of the term. Some claim that there is no scientifically objective assessment of some fruit being nutritionally more "super" than others as fruit is generally packed with different nutritious components.

Similarly, there is no definitive list of superfruit, and new fruit is regularly put forward as being "super". While the term "superfruit" could promote the lesser known tropical fruit, it might impact negatively on the consumption of more established tropical fruit, particularly in an increasingly crowded and competitive international fruit market. In addition, the biodiversity of fruit is attracting attention, as the nutrients and bioactive non-nutrients within species can vary dramatically.

Several cooperatives, associations and companies that produce and market so called "superfruit" have developed an effective marketing strategy and have benefited significantly from the "superfruit" campaign. So, does this mean that the term "superfruit" is a marketing gimmick and is all about branding strategy?

Cognizant of the arguments regarding the definition of superfruit, the Food and Agricultural Organization of the United Nations, the International Tropical Fruits Network (TFNet) and the Ministry of Agriculture and Rural Development (MARD) of Vietnam is organizing an International Symposium on "Superfruits": Truth or Myth? The Symposium will take place in Ho Chi Minh City, Vietnam, on 1-2 July 2013. Experts will discuss the definition of superfruit with regard to nutritional and agronomic properties and characteristics, while proponents or skeptics will exchange views on the actual classification of superfruit. In addition, issues regarding the integration of smallholders in the tropical fruit value chain to enhance market access will also be addressed.

## OBJECTIVES

The objectives of the symposium are to:

a. Define what superfruits are, according to the criteria set by experts – fresh fruits, processed or parts of fruits and plants, and potential tropical superfruits;
b. Present the latest scientific findings on the properties of already recognized superfruits and potential ones;
c. Assess the marketing opportunities for tropical superfruits;
d. Share information on market development, production and demand analyses and value chain analyses of tropical fruits; and
e. Discuss strategies in the

promotion and branding of tropical superfruits.

## PRESENTATION TOPICS

The organisers welcome oral and poster presenters to submit abstracts related to the following topics:

1. Scientific evidence for nutritional characteristics of potential superfruits
   - Anti- oxidant capacity
   - Anti- aging and vitality
   - Anti- inflammatory effects
   - Cardiovascular benefits
   - Nutrigenomics and metabolomics
   - Health and mental well- being claims

2. Agronomic practices for potential tropical superfruits
   - Fruit quality and safety attributes
   - Post- harvest management,
   - Pest and diseases management,
   - Crop physiology,
   - Plant and soil nutrition
   - Others

3. Market developments and business
   - Value chain analysis
   - Production and demand analyses
   - Market development
   - Small holder integration into the value chain
   - Market access
   - Promotion and Branding

## ABSTRACT SUBMISSION

Presenters are requested to submit an abstract of not more than 300 words (Arial font size 11, single spacing). Paper title, authors' names, addresses and emails should be on top of the page.

Posters should be of the A1 size (508 mm X 762 mm)

Please send abstracts on or before 1 May 2013 to:

Email: margarita.brattloft@fao.org
Kindly send a copy to:
webmaster@itfnet.org

## LANGUAGE

The symposium will be conducted in English.

## TARGET PARTICIPANTS

- Agribusiness entrepreneurs
- Research Officers
- Policy makers
- Fruit Producers and Traders
- Extension Agents
- Marketers and Traders
- Academia
- Financial Institutions
- Process and Packaging Technologists
- Non- Governmental Organisations
- Food companies
- Retailers, supermarkets
- Media

## PARTICIPATION FEES

TFNet members : USD 250
Non members : USD 300
Students: USD 150

## FIELD TRIP

Participants are also welcome to join the field trip to the Southern Fruit Research Institute, Vietnam andvarious tropical fruit farms in the Mekong Delta.

Announcement

# TFNet to conduct study on smallholder integration in Indonesia and Vietnam

The International Tropical Fruits Network (TFNet) will be conducting a study on *Policy Interventions to Facilitate Smallholder Integration into Tropical Fruits Market and Value Chains,* funded by the Food and Agriculture Organization of the United Nations (FAO). It aims to undestrand the challenges faced by tropical fruit smallholders in terms of value chain integration and market access. The study will focus on mango and mangosteen in Indonesia and rambutan and pomelo for Vietnam.

# TFNet to organise workshop with AOAD and Sudan Department of Horticulture

TFNet CEO Yacob Ahmad (center) with AOAD Director General Dr. Tariq Moosa Al-Zadjali (right), AOAD Deputy Director General Dr. Ahmed Abdoulwali Al-samwi (rightmost), and Sudan Director General of Horticulture Dr. Badreldin El-Shiekh (left).

A workshop on tropical fruit postharvest management and pest and disease control will be held in Khartoum, Sudan in August 2013, jointly organized by TFNet, The Arab Organisation for Agricultural Development (AOAD), and the Sudan Department of Horticulture.

The workshop was discussed during a meeting between TFNet CEO Yacob Ahmad and AOAD Director General Dr. Tariq Moosa Al-Zadjali on 5 November 2013 at the AOAD headquarters in Khartoum. Other possible projects on improving tropical fruits cultivation in Arab League countries were also discussed.

The Arab Organisation for Agricultural Development (AOAD) was established in 1970 with goal of developing linkages between Arab countries and coordinating all agricultural activities. Countries in the region growing tropical fruits include Sudan, Saudi Arabia, Oman, Yemen, and Qatar.

At the national level, AOAD assists member countries in developing and enhancing their respective agricultural sectors. At the regional level, AOAD facilitates coordination amongst member states in the agricultural sector, with the aim of achieving a fully integrated Arab economy union, and food self-sufficiency.

Tropical fruits such as bananas, mangoes, pineapples, pomelos, limes and guavas are some of the fruits cultivated in the Arab States. Some technical constraints in producing these fruits including water availability, post-harvest losses and pests and disease need to be further addressed.

Cognizant of the challenges in cultivating tropical fruits in these countries, TFNet plans to collaborate with AOAD to develop the commodity and provide food security with more fruit choices.

TFNet CEO presenting the role of TFNet in tropical fruit development to the staff of AOAD

News

# TFNet to collaborate with CIRDAP in future programmes

DHAKA, BANGLADESH: TFNet CEO Yacob Ahmad and Integrated Rural Development for Asia and the Pacific (CIRDAP) Director General Dr. Cecep Effendi discussed on future joint programmes and projects on 19 November 2012. Activities such as capacity strengtheningv workshops are set to be implemented on member States by 2013.

CIRDAP is an intergovernmental centre established in 1979 under the initiative of the Food and Agriculture Organization of the United Nations (FAO) and countries of the Asia Pacific, with the mandate of improving rural livelihood and alleviating poverty.

The centre's objectives are to assist national action and promote regional co-operation relating to integrated rural development in the region, act as a servicing institution for its member states, encourage joint activities to benefit member countries, and poverty alleviation through people's participation.

TFNet CEO explaining the activities of TFNet to the staff of CIRDAP

CIRDAP and TFNet share similar objectives with respect to serving country members. As tropical fruits are part of the landscape in any rural setting in Asia and the Pacific, TFNet plans to have joint activities with CIRDAP, especially those related to production of fresh or processed products on tropical fruits.

News

# 1st International Symposium on Jackfruit held in Bangladesh

The 1st International Symposium on Jackfruit and other Moraceae was held at Bangladesh Agricultural University, Mymensingh, Bangladesh on 18-20 November 2012.

The symposium was organized by Bangladesh Agricultural University Germplasm Center (BAU-GPC), Fruit Science Society of Bangladesh (FSSB), Seed Science Society of Bangladesh (SSSB), International Society for Horticultural Research (ISHS) and International Tropical Fruits Network (TFNet).

The symposium was inaugurated by the Vice Chancellor of Bangladesh Agricultural University, Prof. Dr. Md. Rafiqul Hoque. Forty participants from

Opening ceremony

Bangladesh, India, and Malaysia participated in the symposium that highlighted presentations covering the diversity of jackfruit, selected varieties, vegetable and fresh jackfruit, agronomic practices, product development and processing and marketing.


# 5th IPM Symposium held in Kota Kinabalu, Malaysia

The 5th International Symposium for the Development of Integrated Pest Management for Sustainable Agriculture in Asia and Africa (5th IPM Symposium) was held in Kota Kinabalu, Malaysia on 18-20 December 2012, bearing the theme "IPM: New Frontier Towards Sustainable Agro Ecosystem."

The symposium was jointly organised by the Malaysian Agricultural Research and Development Institute (MARDI), Niigata University Japan, International Tropical Fruits Network (TFNet), University Sabah Malaysia, Malaysian Cocoa Board, Malaysian Department of Agriculture, and Sabah Department of Agriculture.

Deputy Minister Dato Chua Tee Yong of the Ministry of Agriculture and Agro-Based Industry, Dato Chua Tee Yong opened the symposium. "Reducing pre- and post-harvest losses caused by pests can make a significant contribution towards improving food security and safety, and better market access," said Chua.

"This symposium as an appropriate forum to discuss the various challenges posed by pests and design measures to alleviate them," he added.

The symposium aims to provide a platform for crop protectionist from the developing and developed countries to review the existing information and knowledge of IPM, exchange information and expertise, and foster international collaboration.

The 5th IPM Symposium attracted 222 participants from 14 countries. There were 2 keynotes addresses, 33 oral and 71 poster presentations that imparted crucial knowledge in the realm of IPM.

All the presentations dealt with both fundamental and applied research aspects and gave a comprehensive picture of new developments in IPM in various countries and regions.

In his keynote address, Dr. Heong Kong Luen from International Rice Research Institute, Philippines enlightened the participants with the negative effects of pesticides if misused and overused and the role of flowering plants in enhancing natural enemies.

Prof. Geoff M. Gurr from Charles Stuart University, Australia gave a detailed explanation on the functions of ecological engineering in pest suppression and reduction in pesticides dependency in a crop production system.

Participants of the event also went on a field trip to Sabah Agriculture Park on 20th December 2012.

# 5th IPM Symposium Participants visit Sabah Agriculture Park and local guava farm


Sabah Agricultural Park entrance(left), Garden in Sabah Agricultural Park (right).

Participants of the 5th International Symposium for the Development of Integrated Pest Management for Sustainable Agriculture in Asia and Africa went on a field trip to Sabah Agriculture Park on 20th December 2012.

This park is set against a background of truly natural landscape with lush greenery of the Crocker Range, the longest in the country. It functions as both an educational and recreational park with more than 1000 species of plants. The park is divided into 21 mini gardens with magnificent collection of plants and flowers. One of the mini gardens that has a collection of crop plants is the "Living Crop Museum".

**Living Crop Museum**

The Living Crop Plant Museum has 15 major sections, which demonstrates the great diversity of tropical crop plants and how man uses them. The museum has a collection of more than 400 species of economic value grouped in accordance with their uses, such as fruits, spices and condiments, beverages, oil, fibres and nuts.

**Tropical Fruits Section**

There are over 200 species of local and introduced fruits from South America, Africa, India, Australia. Rambutan, pulasan, mangosteen, and durian are commonly grown. Participants showed fondness of pulasan, especially with its green and black variations.

Visit to a guava farm in Inubai Tenom, Malaysia

In addition to that, the wild species shown below (Couroupita guianensis), locally known as pokok tongkat langit, generated much excitement among the crowd but subsided after being informed that the rounded fruits were not edible.

**Visit to Guava Farm-Tenom**

The guava farm is located in Inubai Tenom, only accessible by vehicle though stretches of narrow and gravel roads. The owner of the farm is Chung Fui Lan, cultivating about 4 ha of guava and rambutan. The main crop being guava and able to produce 6-7 mt/month, earning approximately US$ 3000-3500 per month.

The fruits are mainly sold to big cities of Kota Kinabalu and Bandar Seri Begawan. Chung explained that she practiced integrated pest control approaches by bagging the fruits in managing the pest and diseases.

The farm has also obtained Good Agriculture Practices Certification from the Department of Agriculture, Malaysia in 2009. Chung proudly announced that she was awarded the 'Best Farmer of the year' in fruit category during the Malaysian Agricultural Exposition Event in 2008.

# TFNet, CABI, and Bioversity International collaborate for MAHA International

International organizations Centre for Agricultural Bioscience International (CABI), International Tropical Fruits Network (TFNet), and Bioversity International collaborated for an exhibition on the Malaysia Agriculture, Horticulture, and Agrotourism (MAHA) International show on 23 November to 2 December 2012 at the Malaysia Agro Exposition Park, Serdang.

With the theme "International Partnerships in the Promotion of Healthy Crop Landscapes," the booth highlighted the organizations' obligation to broadly reduce food insecurity and improve the quality of life. This is attained by reducing risk and increasing sustainability in crop production and trade.

Risk can be mitigated by using the optimal mix of crop, fertilizer, and water, using resilient crop types and practices, improving the knowledge and market access, and control of invasive species. Meanwhile, maintaining high quality with less inputs, biodiversity protection, ecosystem management, and women involvement can help in sustainability efforts.

The exhibit provided TFNet, CABI, and Biodiversity International an avenue to display what the organizations can offer to the regions of the world.


The 10-day exhibition hosted events such as thematic shows at the state pavilions, business seminars and workshops, conference on technology transfer, product presentations, agriculture technologies and innovations, competitions, agro bazaar, field demonstrations, agro-tourism activities, cultural performances, pet shows, and wellness programmes.


TFNet, CABI, and Bioversity International's booth in MAHA International

# TFNet participates in APO Workshop on Packaging and Labeling Standards for Food Products in Singapore

The Participants and Resource Persons of the Workshop.
*Photo courtesy of APO.*

In line with its goal of enhancing the competitiveness of small and medium enterprises (SME), The Asian Productivity Organisation (APO) conducted a workshop on *Packaging and Labeling Standards for Food Products* at the Gallery Hotel, Singapore on 16-21 September 2012.

Eighteen participants from China, India, Indonesia, Japan, Malaysia, Philippines, Sri Lanka, Thailand, and Vietnam attended. Topics covered the food labeling requirements by Food and Drug Administration of USA, Food Safety Authority of EU, and food packaging developments and innovations in Japan. Technical Officer Mr. Palasuberniam Kaliannan represented TFNet.

The workshop aimed to study the trends, technologies, and business practices in packaging and labeling to enhance the competitiveness of food and agricultural products in domestic and export markets; to learn regulation on packaging and labeling to avoid trade barriers due to noncompliance with those in effect in export markets; and to develop packaging and labeling strategies for APO member countries, which will increase sales of food and agricultural products.

Good product packaging and labeling should not only attract buyers but should also provide correct information on ingredients, nutrition, quality, and safety. However, most food manufacturing SMEs face the difficulty of designing sophisticated food packaging due to the lack of sufficient knowledge and technologies. Many countries also have complicated regulations and standards on food labeling, which can be difficult to follow.

Participants concluded that every country almost has similar labeling standards with differences in the eco-labeling requirements. For packaging, every country has its own regulations with respect to materials that ensure food safety and quality. The material used should not contain hazardous chemicals and should be strong enough to keep hazardous microorganisms from contaminating the food. The requirements for 'Halal' food were also highlighted.

The participants also visited the Singapore Institute of Manufacturing Technology (SIMTEC) to learn about sustainable manufacturing approaches.

New packing materials displayed at SIMTEC.
*Photo courtesy of APO.*

# Philippine fruit experts gather to assess the value chain of minor tropical fruits

Bearing the theme *Value Chain Enhancements to Improve Market Access for Minor Tropical Fruits in the Philippines*, TFNet and the Philippine Bureau of Plant Institute (BPI) conducted a workshop on 3-4 October 2012 at the Grand Regal Hotel in Davao City, Philippines.

Thirty-five participants, including heads of BPI departments, growers, extension officers, and researchers from the Philippines, attended the workshop. Experts from Malaysia, Vietnam, Philippines, and Indonesia presented their experiences in the cultivation, processing, and research focused on minor tropical fruits.

"The extensive knowledge and experiences [of the participants] will provide recommendations that can improve the minor tropical fruit situation against the backdrop of issues including postharvest losses, quality assurance, and market access," said TFNet CEO Yacob Ahmad during his opening speech.

On behalf of Davao City Mayor Sara Duterte, City Agriculturist Leonardo R. Avila III graciously welcomed the participants. He hoped that the workshop can "assess issues and challenges in tropical fruit production and quality, empower farmers, and identify the interventions needed to improve the industry."

Avila added that the workshop can help the participants identify ways to improve market access for fruits and increase trade in both domestic and export consumption.

BPI Director Clarito M. Barron and Assistant Director Henry T. Carpiso were also present in the opening.

Seven papers were presented to help participants identify the gaps along the tropical fruit value chain and recommended key activities and interventions that can help improve fruit quality, food safety, marketability, and meet international trade requirements.

Dr. Edna Anit of the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) provided an overview of the minor tropical fruit industry in the Philippines, stating that minor fruits such as durian, jackfruit, langsat, and pummelo are only produced for domestic comsumption.

Meanwhile, Ahmad provided a global overview of the tropical fruits. "The demand for tropical fruits globally is increasing,Urban consumers are diversifying in taste, demanding for more fruit options that are safe and of high quality," he said.

Dr. Emma Bayugan of the University of the Philippines Mindanao discussed postharvest management for tropical fruits.

Minimally processed ready-to-eat fruits that are packed in containers were discussed by Latifah Mohd Nor of the Malaysian Agricultural Research and Development Institute (MARDI).

Dr. Dwi Iswari of the Indonesian Ministry of Agriculture discussed her country's experiences in growing salak and mangosteen.

Vietnamese presenters Dr. Nguyen Thanh Hieu of the Southern Fruit Research Institute (SOFRI) and Dr. Nguyen Quoc Hung of the Fruit and Vegetable Research Institute talked about dragonfruit and pomelo, respectively.

Participants of the workshop

# Success is sweet for Davao's Golden Pomelo

DAVAO, PHILIPPINES: Participants of the workshop Value Chain Enhancements to Improve Market Access for Minor Tropical Fruits in the Philippines visited the 350-hectare Davao Golden Pomelo farm.

Hailed as Davao's pomelo king, Carmelito Mercado is arguably the top pomelo producer and distributor in the Philippines. From his humble beginnings as a trader, Mercado's determination and thirst for knowledge to improve his business has bore fruit.

In 1982, Mercado inherited his family trading business. As surplus of langsat and rambutan easily spoil, he opted to focus on the imperishable pomelo. Since the fruit quality and yield of small-scale pomelo farmers were inconsistent, Mercado decided to venture in production.

As a graduate of Commerce, farming isn't a part of his skill. His friends invited him to join the Davao Fruit Association, where he learned the basics of farming. A fervent self-made scholar, Mercado purchased several books from the US on citrus farming.

What started as a 1-hectare lease has now expanded to the 350-hectare Davao Golden Pomelo Farm that Mercado owns. It produces the Magallanes variety – the preferred variety of Filipinos for its sweet pink flesh. The oldest trees in the farm are 17 years old and can bore as much as 600 kg per plant.

Through experimentation in agronomic practices, the Magallanes variety can now reach a brix level of 13. "We try to make the best possible condition for the plants to fruit," says Mercado. "If there are problems, my technical group brainstorms and provides the solutions."

One of the problems he mentioned is the citrus rind borer


5kg box of Mercado's Golden Pomelo

(*Prays endocarpa* Meyr). This moth's larvae burrow and feed on the pulp. Gall-like swelling and lumps on the fruit skin indicates rind borer infection. Mercado controls this pest by using pesticides and other integrated pest management practices.

Mercado also trims branches infected with whiteflies. Whitefly infestation creates scabs, affecting the taste and even leads to fruit drop. Infected branches are trimmed and burned.

Pomelo farms in Mindanao are also affected by the gummosis disease caused by Phytophthora sp. Fruit rot occurs when sap oozes from wounds and cankers. Mercado uses copper-based chemicals to combat this. "It is important to properly identify the disease to provide the appropriate control," said Mercado.

Mercado has no plans to expand in pomelo processing. "We want to focus on production. There is a lot of areas for improvement. However, the [TFNet-BPI] workshop gave me an idea to venture into minimally processed fruits that can be sold in supermarkets here in Davao."

# Pomelo: The "lucky" giant citrus... (from page 1)

**Magallanes pomelo variety grown in Davao, Philippines**

## Common Names

| | |
|---|---|
| English | Pomelo, Shaddock |
| Bengal | Batabi Lebu |
| Malaysia | Limau Bali |
| Indonesia | Jeruk Bali |
| French | Pamplemousse |
| Fiji | Moli Kana |
| Guam | Kahet Magas |
| Thailand | Som O |
| Pakistan | Chakotara |
| Philippines | Suha, Lukban |
| Palau | Jabong |
| Samoa | Moli Tonga |
| Spanish | Cimboa |
| Vietnam | Buoi |

The rind is thick and leathery, which contains oil glands. It is recommended to peel the skin with a knife as the 1.23-cm thick rind may be difficult to peel by hand. White mesocarp covers the edible flesh, and is divided into many sections.

The pulp is juicy and the color varies from greenish-yellow, pale-yellow, pink, or red. The pulp can be sweet, bland, or tangy but not as acidic as other citrus.

Pomelo seeds are large, plump, pale yellow-white, flattened, and angular. They are unique among its citrus cousins for having a single embryo. Others are polyembryonic.

## Common Varieties

**Honey Pomelo** is grown in Pinghe, China. It is seedless and sweet with semi-transparent flesh. Its skin color varies from light green to lemon yellow.

**Tambun White (PO52)** is commercially planted by Malaysian farmers. It is seedless and has a high juice content, weighing 1.4-1.7 kg. The skin is light green to light yellow. The fruit is sweet and popular among locals.

**Da Xanh** is a green-skinned and round pomelo from Vietnam. Fruit weighs 1.0-1.5 kg with juicy pinkish red flesh when ripe. The pulp contains sweet juice of 11-12% brix.

**Siamese Sweet** is an acidless, sweet pomelo from Thailand. It has white pulp with large, crisp, non-juicy sacs easily separating from each other. Its flavor is mild but faintly bitter. This variety has been used in many citrus development programmes.

**Magallanes** is a popular cultivar grown in the Philippines. Fruits are small- to medium-size, weighing 0.7-0.9 kg. Flesh is pink when ripe with brix content of 9%. It is consumed domestically.

## Propagation

Pomelo can be propagated by many methods including seeds, cuttings, air-layering, grafting, and marcotting.

Commercially, it is commonly propagated by grafting an individual bud of a selected variety onto a rootstock seedling or by air-layering method.

Cultivars reproduced by seed are considered inferior, not uniform and takes a long time to produce fruit.

## Fertilization

Fertilizers containing N and K are best applied in small applications several times over the course of

the year. In addition to inorganic fertilizers, well composted manures or other organic fertilizers can be added to the planting hole and spread around the base of the tree occasionally.

## Pruning

Once the tree has reached the desired height, annual pruning may be required to maintain the height, thin the growth, and promote prolific fruiting. Pruning should be done when trees are young to establish the basic shape and continued as trees mature. Pruning is conducted to either encourage growth (thinning) or reduce tree size (heading back).

## Pest and Diseases

Compared to other citrus, pomelos are relatively tolerant to most pests and diseases.

Leaf miner (*Phyllocnistus citrella*), leaf-eating caterpillar (*Papilio demoleus, P. polytes*), fruit-borer caterpillar (*Citripestis* sp.), scale insects (*Chloropulvinaria psidii*), red mites (*Panonychus citri*), fruit flies (*Bactrocera dorsalis*), nematodes (*Pratylenchus* sp., *Tylenchulus semipenetrans*, and *Meloidogyne* sp.) and rats (*Rattus* sp.) are the common pests for pomelo.

Bacterial canker (*Xanthomonas campestris* p.v. citri) is common disease on citruses, although not a serious treath to pomelo. Root rot (*Fusarium solani, Phytophthora* sp. and *Pythium* sp.), gummosis (*Phytophthora nicitianae* var. parasitica, *P. citropthora, P. palmivora)* and brown rot (*Phytophthora* sp.) are common diseases of pomelo.

Physiological disorders include fruit cracking from boron deficiency and moisture imbalances.

## Harvesting

Fruits for marketing are generally harvested when they are just beginning to turn color. In Malaysia, the fruit matures in about 5.5 months from flowering. When the weather is hot throughout the fruiting season, the fruit may ripen about a week earlier. If the weather is hazy or cloudy, with frequent rain during the fruiting season, maturity can be delayed to over six months. The dull skin of the unripe fruit brightens upon ripening, as the oil glands in the rind become more prominent and shiny.

## Market

Pomelo fruit is eaten fresh or processed into juice. Its nutritional value is slightly better compared


**Packing pomelo for export in Vietnam**
*Photo by Nguyen Quoc Hung, SOFRI, Vietnam*

## Quick Facts: Agroclimatic Suitability

Elevation: up to 700m above sea level
Rainfall: less than 50cm
Annual Temperature: 24-35°C
Soil: deep, well-aerated, no hard layers of calcium carbonate
Soil Texture: loose
Soil Acidity: 5.5-7.5 pH
Humidity: low to high
Drought tolerance: low
Salinity tolerance: medium
Sun tolerance: high
Frost tolerance: light frost is tolerated
Waterlog tolerance: low
Wind tolerance: high
Pest tolerance: medium
Disease tolerance: high

**Packinghouse in the Philippines**

with grapefruit, but less so with orange.

The fruit can remain at room temperature for up to two months. It can maintain its freshness for few months when stored in the fruit drawer of the refrigerator. The optimum storage temperature for pomelo is about 12 C.

## Food Value

Pomelo is an excellent source of vitamin C and a good source of folate, potassium, phosphorus, vitamin A, and calcium.

| Nutrition Facts | |
|---|---|
| Serving Size 190 g | |
| **Amount Per Serving** | |
| **Calories** 72 | Calories from Fat 1 |
| | % Daily Value* |
| **Total Fat** 0g | 0% |
| Saturated Fat 0g | 0% |
| Trans Fat 0g | |
| **Cholesterol** 0mg | 0% |
| **Sodium** 2mg | 0% |
| **Total Carbohydrate** 18g | 6% |
| Dietary Fiber 2g | 8% |
| Sugars | |
| **Protein** 1g | |
| Vitamin A 0% • Vitamin C | 193% |
| Calcium 1% • Iron | 1% |

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

## Other Uses

**Traditional Medicine**: The Chinese believe that pomelo fortifies the lungs and the spleen. It is also believed that the fruit can reduce abdominal pains, oedema, and phlegm. The leaves are boiled into a lotion and applied on swellings and ulcers. Decoctions of the leaves, flowers and rind is believed to alleviate epilepsy, chorea, and convulsive coughing.

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# Production and trade of pomelo and grapefruit

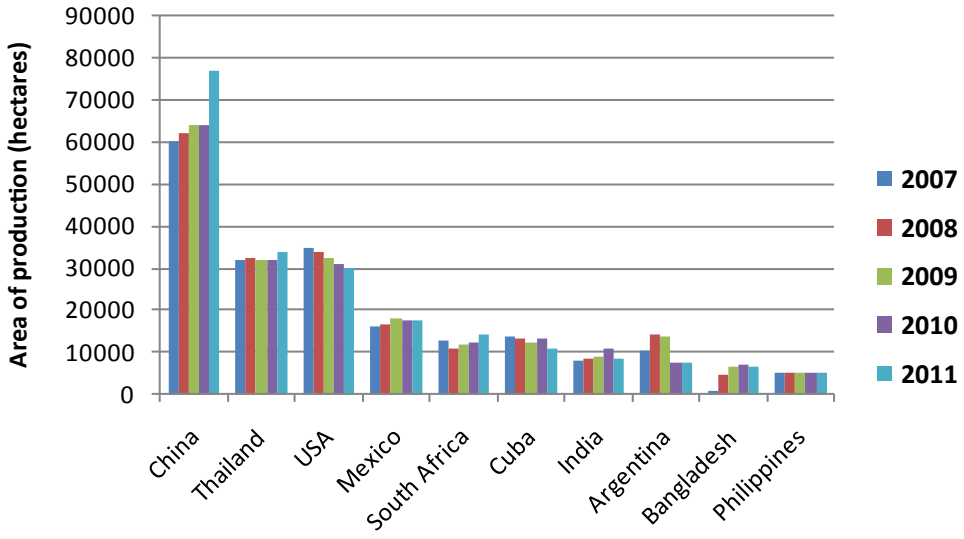
Like other tropical fruits, pomelo has grown as an essential commodity in international markets. Producing countries value the fruit for commercial viability and nutritional content. There's a high demand for pomelos from Chinese communities, especially during Lunar New Year when displaying and eating the fruit is said to bring good fortune. Western consumption of pomelo is also increasing due to its juicy and nutritious pulp.

The world area of production for pomelo (and grapefruit) is estimated at 276,222 ha in 2011, decreasing by 2000 ha in 2010. Most countries decreased the area of production in 2010-2011, except for China (64,128 ha to 77,000 ha,) Vietnam* (increased to 45,200 ha), Thailand (31,779 ha to 33,826 ha), and South Africa (12,100 ha - 14,000 ha).

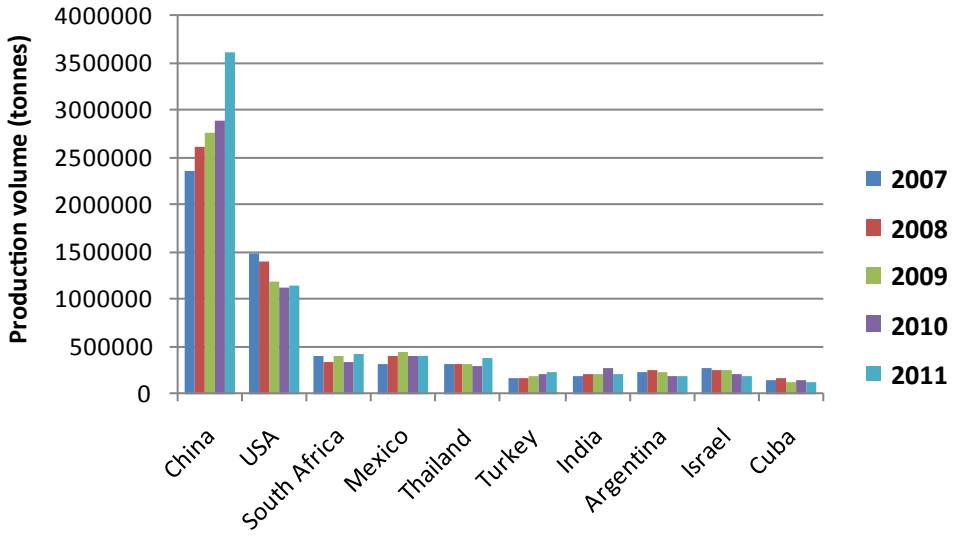
Other top 10 producing countries in terms of area are Mexico, Cuba, India, Argentina, Bangladesh, and Philippines.

In spite of the decrease in hectarage, world production increased from 7.1 million tonnes in 2010 to 7.7 million tonnes in 2011. Production is predicted to increase as worldwide demand increases.

China is the main producer in 2011, producing 3.6 million tonnes of pomelo (and grapefruit). Second is USA with 1.1 million tonnes, third is Vietnam* with 424,334 tonnes, and fourth is South Africa with 415,679 tonnes.

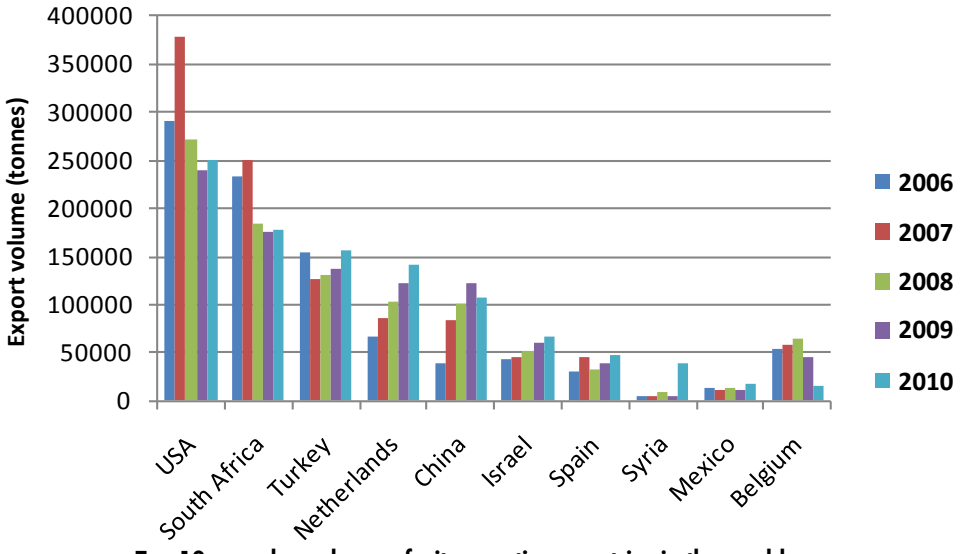



**Top 10 pomelo and grapefruit producing countries in the world, in terms of land area (source: FAOSTAT)**

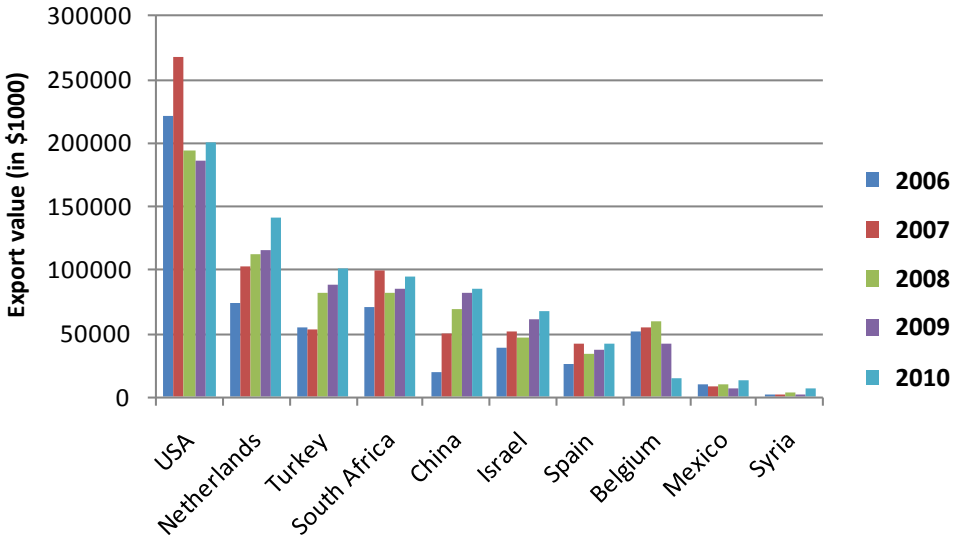



**Top 10 producing countries in the world. (source: FAOSTAT)**

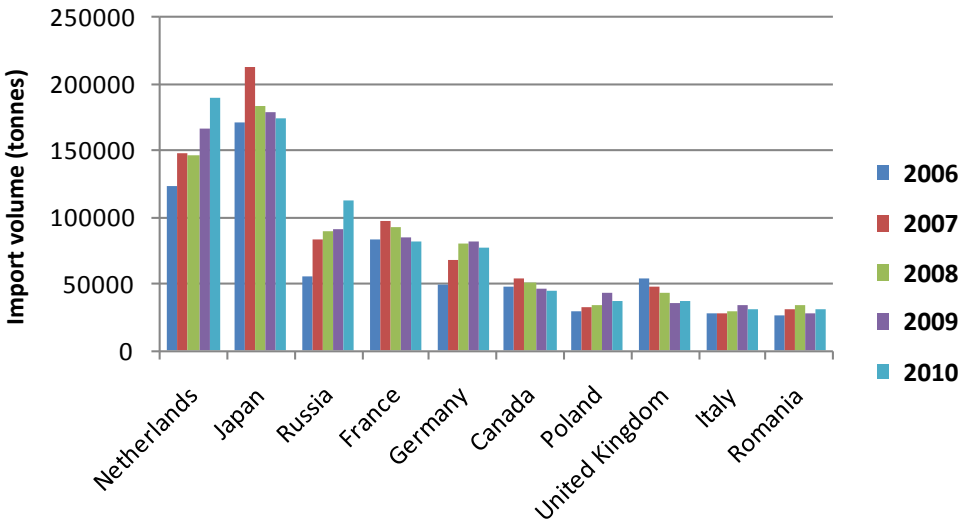
*Data from Southern Fruit Research Institute (SOFRI), Vietnam. Data is not reflected in FAOSTAT.




**Top 10 pomelo and grapefruit exporting countries in the world (source: FAOSTAT)**




**Top 10 pomelo and grapefruit exporting countries in the world, in terms of export value (source: FAOSTAT)**




**Top 10 pomelo and grapefruit importing countries in the world, (source: FAOSTAT)**

Still in the top 10 but trailing behind are Mexico, Thailand, Turey, India, Argentina, Israel, and Cuba.

USA leads in world exports with 249,507 tonnes valued at USD 200 million. South Africa was 2nd with 177,396 tonnes valued at USD 94 million. Turkey is 3rd 156,642 tonnes valued at USD 101 million.

Syria had the most noticeable increase in exports, increasing 7-fold from 5600 tonnes in 2009 to 39,375 tonnes. Meanwhile, Belgium decreased in exports from 46,297 tonnes in 2009 to 16,419 in 2010.

The biggest import market for pomelo and grapefruit is the Netherlands, with 190,198 tonnes valued at USD 188 million. Next is Japan with 174,771 tonnes valued at USD 186 million. Other top importers include Russia, France, Germany, Canada, Poland, The UK, Italy, and Romania.

The challenges of the pomelo industry include the consistency of high-quality fruits, availability throughout the year, and pest and disease control.

The increasing world demand for pomelo will encourage larger production for export and domestic consumption.

More research should be done to inprove the quality and safety of fruits and increase production to meet the increasing demand.

## Thai Pomelo Salad (from http://rasamalaysia.com)

*Photo courtesy of Bee Yinn Low, rasamalaysia.com*

### Ingredients

One 1.5- to –lb pomelo, peeled and separated into segments
1 lb 21-26 count shrimp, peeled and deveined
 cup desiccated coconut flakes (unsweetened)
½ cup coconut milk
Dried red chile flakes, to taste (I use whole Mexican chile pequin as they are very easy to crumble up with your fingertips and taste just like dried bird's eye chiles. They're also very, very cute.)
4 tablespoons finely-minced shallots or onion
2 tablespoon finely-minced garlic
2 tablespoon vegetable oil
½ cup plain roasted peanuts, roughly chopped
Fresh lime juice, to taste
Fish sauce, to taste
A handful of Fresh cilantro leaves

### Instructions

1. In a small saucepan, sauté vegetable oil, shallots, garlic, and dried pepper flakes. Add coconut milk and heat through. Set aside to cool.
2. Dry toast the desiccated coconut flakes until medium brown. Set aside to cool.
3. Poach the shrimp, drain, and set aside.
4. Gently break up the pomelo segments into roughly ½-inch pieces and put them mixing bowl.
5. Add the poached shrimp, coconut mixture, toasted coconut flakes, peanuts, and cilantro.
6. Add 2 tablespoons each of the lime juice and fish sauce and toss together.
7. Serve immediately with additional roasted peanuts and toasted coconut on top, if desired.

## Pomelo Couscous (from http://www.thekitchn.com)

### Ingredients

3/4 cup water
2 teaspoons macadamia oil, divided (can substitute buttery olive oil or butter)
Salt
1/2 cup instant couscous
1/2 cup vegetable oil
2 large shallots, thinly sliced and separated into rings (about 1/2 cup)
1 (1 1/2-pound) pomelo, peeled and separated into chunks
1/4 teaspoon finely grated ginger
2 tablespoons chiffonade of mint

### Instructions

1. Bring water to boil in a saucepan. Add 1 teaspoon macadamia oil, a dash of salt, and couscous. Cover, remove from heat, and let stand for at least 5 minutes. Fluff the grains with a fork and cool completely.
2. Heat vegetable oil in a small heavy pot over medium heat until a thermometer registers 325 F. Add shallots and fry, stirring constantly, until golden brown. Remove with a slotted spoon, drain on towels, and cool completely.
3. In a large bowl, combine couscous, 1 teaspoon macadamia oil, a dash of salt, and ginger using a fork or your hands. Add pomelo segments, half of the fried shallots, and mint and gently toss to combine.
4. Garnish with the remaining fried shallots and serve.

# Study finds that bromelain may reduce bronchial inflammation caused by asthma

Despite new pharmacological advances on acute treatment and chronic-disease management, allergic asthma continues to be a common disease. Causes for asthma are genetic, allergic, infectious, environmental, and dietary in origin.

Alternative studies are being conducted on possible treatments such as lifestyle changes and traditional medicine, including the ability of bromelain to inhibit inflammation.

Bromelain is an extract found in pineapples. Introduced as an alternative treatment in 1957, bromelain may work by blocking proinflammatory metabolites when applied topically. It has also been used after surgery to reduce swelling.

Researchers in the University of Connecticut School of Medicine, USA, found further proof that bromelain has anti-inflammatory effects against asthma attacks.

Published in the *Alternative Therapies in Health and Medicine* Journal in September 2012, the research suggests that bromelain has a therapeutic effect in established Allergic Airway Disease (AAD) on mice.

The AAD effects of asthma was induced to the mice test subjects via ovalbumin (OVA).

The mice were initially sensitized with OVA and exposed for 10 consecutive days. On day 4, the intervention group received daily dosage of 6mg/kg bromelain phosphate buffered saline (PSB) solution. The control group was administered with PSB only.

The effects were measured using bronchoalveolar lavage (BAL) cellular differential, cellular phenotype via flow cytometry, and lung histology. Additional outcomes included testing for serum cytokines and immunoglobulin.

The mice treated with bromelain group showed reduced BAL total leukocytes, eosinophils, and cellular infiltrates via lung pathology, compared to the control group.

In addition, bromelain significantly reduced BAL CD4+ and CD8+ T cells without affecting cell numbers in the spleen or hilar lymph node.

The study found decreased interleukins IL-4, IL-12, IL-17, as well as IFN- in the serum of bromelain-treated animals.

While the results remain inconclusive if applied to humans, it suggests that bromelain can have a therapeutic effect in established AAD. This may translate into an effective therapy in patients with similar conditions, such as allergic asthma, who have chosen to initiate treatment after the onset of symptoms.

## Other possible uses

In some countries, bromelain is packaged as the product *Ananase*, used for folk medicine and alternative medicine. It is believed to help digest proteins, relieve peptic ulcer, and hemophilia.

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# Producing melons using palm oil mill waste in Malaysia

With a planted area of 4.9 million hectares, Malaysia is second to Indonesia as the world's biggest palm oil producers. About 420 oil palm mills in Malaysia grapple with the amount of waste generated in the palm oil extraction process.

On the average, a palm oil mill requires approximately 5.5 tons of fresh fruit bunches to extract 1.0 ton of crude palm oil. The waste products generated are empty fruit bunches (28%), fibres (24%), shell (6%), decanter cake (3%), and palm oil mill effluent.

Oil palm decanter cake (OPDC) is a solid waste produced after the clarification process to retrieve oil from sludge. OPDC contains nutrients including Nitrogen 2.42%, Phosphates 0.51%, Potash 1.29%, Calcium 1.6%, and Magnesium 0.5%. It is commonly used as a soil ameliorant and organic fertilizer.

In a move to utilize OPDC from palm oil factories, the Malaysian Department of Agriculture Horticultural Division initiated a project in its Food Production Park Program in Besut, Terengganu, to produce melons by hydroponics/ soilless culture. It uses the fertigation technique with a mixture of 60% oil palm decanter cake (OPDC) and 40% coco-peat as planting media.

The melons are produced in plastic (rain shelter) houses, where planting beds of the OPDC and coco-peat mixture are covered with 'silvershine' plastic sheet to retain moisture and control weeds. The beds measuring 1 meter in width, 0.3 m high and 32.2 meters long are also treated with microorganisms to promote composting. Planting holds are punched into the plastic holes for the establishment of 3 week old 'glamour' variety melon nursery raised seedlings. The plants on the beds are fertigated two to four times a day, depending on the weather and condition of the plants.

**Young entrepreneur packing the melons for the market**

**Melon variety 'glamour' grown on oil palm decanter cake and cocopeat**

*Photos courtesy of Department of Agriculture, Malaysia.*

Appropriate combination and timing of fertilizer application through drippers and foliar sprays coupled with recommended pruning methods can produce 2 melons per tree with an average weight of 2.5 – 3.0 per fruit.

The project involves 11 participants who are young entrepreneurs in 64 plastic houses covering an area of 6.4 ha. The participants attend capacity strengthening programs of the Department of Agriculture Malaysia on production technology of melons including fertilizer requirements, pests and disease management, cultural methods and post-harvest management. Melons are preferred due to the consistent demand and attractive farm price.

Melons are sold at an average of USD 1.00 per kg. The cost of production averages around USD 0.50. Participants have reported an income of USD 1,000 to 1,200 per month, indicating that proper utilization of waste materials from oil palm mills can provide extra income for farmers. The Malaysian Department of Agriculture intends to encourage more farmers to participate in this program.

# Malaysia: Frozen durian export to China expected to grow in 2013

*Based on reports by the Department of Agriculture, Malaysia*

After two years of negotiation and compliances to the Quarantine requirements stipulated by The Chinese Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), Malaysia gained market access for its frozen durian on 11 May 2011. This came into effect following the visit of Premier Wen Jiabao of the People's Republic of China to Kuala Lumpur in late April 2011.

The first frozen durian processing plant approved by AQSIQ was the Federal Agriculture Marketing Authority's (FAMA) Fresh Fruit Processing Centre in Batu Kurau, Perak. This complex has the capacity to process 3 mton of fresh whole fruit per, producing approximately 750kg of pulp (equivalent to 1,500 trays @ 500g/ tray).

Malaysia exported around 200 metric tons of frozen durian valued about U$5 million to China since the approval. The clones 'Musang king' seems to be the most preferred by the Chinese, however other clones such as D24 has been included in some of the shipment to fill the required quantity.

There were more demands but the only approved processing plant had limited processing capacity. However, the volume of export is expected to increase over the years

Frozen fruit packed into carton boxes.
*Photo courtesy of FAMA, Malaysia.*

Selected clones of fresh fruits collected at the farm.
*Photo courtesy of FAMA, Malaysia.*

with the approval of additional five more processing facilities by the AQSIQ in October 2012.

China's import of durian increased by 20.41% from 2009 to 2010, with a value of US$149.55 million. Malaysian durian has a different texture, taste, and aroma compared to its Thai counterparts, providing China's consumers with more choices.

Thailand is the only country that has been exporting fresh whole fruit since 1970s. Almost all shipments are sent via sea because

Pulp trays are weighed individually (500g/tray)
*Photos courtesy of FAMA, Malaysia.*

the fruits are harvested 10-14 days before it ripens. This lenghtens the shelf life, in turn lowers costs because of easier transport.

Malaysian durian are collected as it ripens and drops to the ground. At this state, it is difficult to export because it only lasts between 24-48 hours. This short storing period has made the researches and exporters in Malaysia look into alternative means for storage during transportation.

The quarantine requirements imposed for the export of frozen durian by the AQSIQ China are as follows:

1. Obtain Phytosanitary Certificate (issued by Ministry of Agriculture and Agro-based Industry) and Health Certificate (issued by Ministry of Health, Malaysia)..

2. Loose pulps frozen at -30 C for 30 minutes, stored and exported at -18 C.

3. Fruits sourced from farms registered with Department of Agriculture Malaysia and has the Good Agriculture Practices (GAP) Certification

4. Fruit Processing Centre must be registered with Department of Agriculture Malaysia and obtained Good manufacturing Practice (GMP) certificate from Ministry of Health, Malaysia.

5. The farm and processing plant will be inspected and approved by AQSIQ.

## Approved Durian Processors in Malaysia

1. Cold Room Complex, FAMA Batu Kurau,
Batu 16, Jalan Besar
34500 Batu Kurau,
Perak Darul Ridzuan

2. TopFruits Sdn. Bhd
53-G, Jalan Orkid 4, Taman Orkid,
43200 Cheras, Selangor

3. Hernan Corporation Sdn. Bhd. (Subang, Selangor)
No 8, Jalan PJU 1A/13
Taman perindustrian Jaya,
47200 Subang, Selangor

4. Le Moon Sdn Bhd
Kienamal Industrial park
Bukit angkat
43000 Kajang, Selangor

5. ARTM Services Sdn Bhd
Lot 126, Melaka Halal Hun,
Kaswasan Perindustrian Serkam,
77300 Merlimau, Melaka

6. FAMA AMC
No. 85-86, Jln Industri 2,
Kawasan Perindustrian Jerantut,
27000 Jerantut, Pahang

# Growing tropical fruits in arid Sudan

Though it lies in the Tropics, Sudan's climate ranges from arid in the North to tropical in the South West.

Arid and semi- arid areas are characterised by erratic and low precipitation of 700 mm per annum, experience periodic drought, poor vegetation and poor soils. The area north of the Khartoum, Sudan receives an average of between 165 mm precipitation per annum. Daytime temperature ranges from 32 to 44 degrees Celsius. There have been attempts by advanced farmers to plant tropical fruits in these arid areas of Sudan.

In spite of such dry conditions, the abundant ground water, has made it possible to cultivate tropical fruits in the areas North of Omdurman, Khartoum.

**Pomelo plant surrounded by *Cajanus cajan* legume plant to improve soil fertility**

**Mr. Salah, owner of the farm, showing a guava variety**

**Compost pit with shredded date palm leaves and chicken dung used as organic fertilizers**

The Algoussi Company has developed 65 ha of land: about 35 ha planted with dates, while the other 30 with grapefruit, pomelo, limes, guava, buckthorn (Ziziphus sp.), and trial plots of mango. The grapefruit, pomelo, guava, and buckhorn have shown promise of good growth.

The irrigation distribution system comprising of pumps, concrete ponds, primary and secondary pipe network, and drippers are key factors for the trees to survive arid conditions. The plants are placed in compost-filled holes with slight earth mounds around the canopy for each planting point, maintaining soil moisture and preventing irrigation water loss by run off.

Compost is used to improve the soil structure and water holding capacity. It is a mix of shredded date palm leaves and chicken dung. Other cultural practices include the planting of wind breakers and legume cajanus cajan to improve the soil nitrogen content around the planting hole during establishment.

The growing of tropical fruits in arid areas may be able to assist in mitigating desertification with the condition that there is adequate underground water. Tropical fruit trees also make good wind breakers.

# Sapodilla from the Southern Mekong Delta, Vietnam

Sapodilla or Manilkara zapota is a tropical fruit that can be found grown in South East Asia, South Asia, Africa, Latin America and the Caribbean. It is believed to have been originated from the Yucatan and Southern parts of Mexico, and later spread to other countries around the Equatorial belt. There are numerous cultivars of the fruit developed in the different countries.

The tree grows to 3-4 m tall. The elliptic to ovate leaves are light green to pink when young, turning dark green and glossy when mature. The sweet brown fruit has been described as 'a small potato', 'a small tomato', 'a round kiwi fruit', or 'a soft elongated tan egg'.

When it comes to developing a superior sapodilla cultivar, Vietnam is no exception. The most popular cultivar is the Mac Bac variety, which is grown in areas around the Southern Mekong Delta.

At Kim Son village, in Chau Thanh Province, Tien Giang, there are altogether about 1,500 farmers, growing sapodilla as a main fruit crop on 800 ha of ex paddy land. The sapodilla is sometimes intercropped with citrus. Most of the trees are more than 20 years old and the average yield is about 80 tons per hectare. For an area the size of 2,500 sq metres, the farmer is able to earn about USD 14,420 a year.

**Farmer on motorcycle taking his fruits to the wholesale market**

Even though sapodilla can be harvested twice a month for the whole year, the peak months are from December to March, where harvesting is more frequent.

The farmers sell the sapodilla at 15,000 VND per kg, which is equivalent to USD 0.70. The harvested fruits are first cleaned with cloth soaked in lime water to smoothen the rough surface before they are sold to the wholesalers.

**Sapodilla growing area in Chau Thanh District, Tien Giang, South Vietnam**

# Improving tropical fruit research using a systems approach

based on a presentation by Bob Williams, Director, Australian Department of Plant Industries, at the *5th International Symposium for Tropical and Subtropical Fruits, Guangzhou China, June 2012*

The research community is shifting into a paradigm that focuses on consumer-driven research among teams across various disciplines.

The research strategies employed should move away from traditional practices and use a systems approach. This approach integrates analytic and synthetic methods, with the notion that all areas affect one another and issues should be addressed accordingly.

Notable challenges faced by tropical fruit producers, especially mango, in Asia are varying productivity, diseases like Anthracnose, stem end rot and pests such as fruit fly. Postharvest hadling and packaging also provide some difficulties in certain areas.

**Anthracnose (left) and stem end rot (right).**
*Photo courtesy of Bob Williams.*

## Diseases

Anthracnose is caused by fungi (usually *Colletotrichum* or *Gloeosporium*) that cause sunken spots of various colours in leaves, stems, fruits, or flowers. These spots enlarge and lead to wilting, withering, and dying of tissues.

On the other hand, stem end rot is caused by fungi *Dothiorella dominicana, Phomopsis* spp., *Botryodiplodia theobromae* or *Lasiodiplodia theobromae.* Dark rot develops from the stem end after the fruit is harvested. The rot turns the flesh dark and releases watery tissues.

The traditional approach in treating Anthracnose and stem end rot is by using preharvest fungicide sprays and postharvest fungicide dip.

This, however, is a knee-jerk approach that focuses on the disease post-flowering. It increases the pressure on the fungicide, leading to resistance.

This also raises food safety issues as the method leaves fungicide residues in fruit. Some fungicides do not meet CODEX standards.

With the systems appoarch, it is recommended to reduce the amount of the inoculum as much as possible.

Practices that reduce the inoculum include selecting appropriate planting materials, pruning and destruction of crop residues, elimination of living plants that carry pathogens, and crop rotation.

Fungicide can still be sprayed but should be strategically integrated in the system. Efficiency of postharvest fungicide dip should also be improved.

By working together, pathologists and plant physiologists can understand the aetiology

of the pathogen at all stages of plants phenology. Fertilizer programs that impact on the plants defence mechanisms when the pathogen is weakest have also been implemented. Finally, plant activators have been utililized to compensate for the impact of fertilizer on defence mechanisms.

## Fruit fly

The oriental fruitfly (*Bactrocera* spp.*)* is one of the most serious pests of mango in South East Asia. The female lays eggs on the fruit. After hatching, the larva feeds on the pulp.

Fruit fly is a common problem that hinders access to international markets. Countries such as Australia and Japan imposed strict measures to prevent the intoduction of new pests carried by mango.

Common required treatments to combat fruit flies are vapour heat, hot water, and irradiation.

For the system approach, it is important to identify which stage of maturity mango becomes susceptible to fruit fly infection.

To test, an experiment was conducted. Two pest species were studied on 4 varieties of mango. Fruit fly trapping was used to determine the pest population. No field treatments were implemented to manage the pest.

So far, 40,000 commercially harvested fruit have been assessed. They were collected and stored at for 12-14 days at 22°C.

**Common fruit fly (left) and mango infected with fruit fly (right).**


*Photos courtesy of Bob Williams.*

Results of the experiment was surprising: no fruit flies were present in any single fruit. This implies that fruit fly infestation occurs during the postharvest and market stage.

Market access requirements shouldn't be based simply on agronomic practices. Commercial practices should alse be dealt with equal importance.

Traditional methods of solving agricultural problems are effective on their own right, but are one-dimentional. A systems approach can address the problem holistically through the integration of disciplines, learning the impact of interventions from multiple disciplines, common understanding of plant phenology, communication, and team work.

# RC Fruit Conservation Farm boasts impressive collection of 200+ tropical fruits

LAGUNA, PHILIPPINES: Though it started as a humble coconut plantation in 1986, the RC Fruit Conservation Farm is now one of the biggest fruit collection in the Philippines.

Owned by Dr. Roberto Coronel, Professor Emeritus of the College of Agriculture, University of the Philippines Los Baños (UPLB), the farm now includes more than 200 species of tropical fruits and nuts from all over the world. More than 60 species are indigenous to the Philippines, 73 species from Asia, 80 species from the Americas and 8 from Africa.

Yellow Mangosteen (*Garcinia xnthochymus* Hook)

"I acquire the plants during collection trips," said Coronel. "I used to collect germplasm for the Institute of Plant Breeding, UPLB. It became my personal hobby. In fact, the first species planted in RC Farms is a duplicate of the university's collection."

When Coronel acquried the farm in 1986, hes slowly transformed the coconut plantation by intercropping fruit trees. "I planted the best varieties of rambutan and langsat. Over the years, I slowly added more. It's an ongoing project."

"Over the years, the ecological system of the plants have slowly developed. Now, we no longer fertilize or spray against pests."

Typhoons and tropical storms are common in the Philippines and often damage crops. "RC farm has a 3-layer canopy system that protects the plants from typhoons. The coconut is the first line of defense, next is the layer of rambutan, mangos and other trees. These two layers protect smaller trees like mangosteen and langsat."

Abiu (*Pouteria caimito*)

Coronel has also identified undertilized crops that can be developed for consumption and processing.

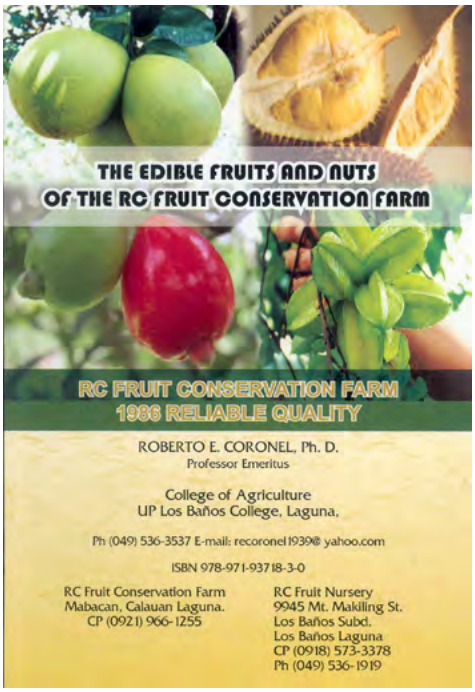
For consumption, the abiu (*Pouteria caimito*) is a promising candidate. Endemic in the Amazon, Coronel is instrumental in bringing abiu to the Philippines. When ripe, abiu is round, smooth, and bright yellow skin. The flesh is white and translucent with a creamy texture and tastes like sweet caramel custard.

For processing, the tinctoria or yellow mangosteen (*Garcinia xanthochymus* Hook) is ideal for fruit powder flavoring. Unlike its cousin mangosteen, the yellow mangosteen is sour and is traditionally used in Southern Philippines to make the native sour soup *sinigang*.

Dr. Coronel published a compendium of fruits in the RC farm in his book "The Edible Fruits and Nuts of the RC Fruit Conservation Farm."

Feature

# Seven indigenous underutilized fruits of the Philippines




Dr. Roberto Coronel is one of the most prolific writers and fruit scientists in the Philippines. He published 14 scientific papers in referred journals and also wrote the book "Promising Fruits of the Philippines." He is also the Chairman of the Philippine National Seed Industry Council (NSIC) - Technical Working Group, where he edited the "Catalogue of NSIC-registered Fruit Varieties."

In his book "The Edible Fruits and Nuts of the RC Fruit Conservation Farm," Dr. Roberto E. Coronel compiles more than 200 tropical fruit species present in his collection. Here are some tropical fruits that are indigenous to the Philippines.

## 1. Velvet Fruit (*Diospyros blancoi* A. D.C.)

Locally known as *Mabolo*, the velvet fruit got its name from the hairy skin that covers the fruit. When ripe, the pungent smell is similar to strong cheese. The fruit is sweet and grainy and is mostly eaten raw. It contains vitamin B complex, vitamin C, vitamin A, calcium, iron, and potassium.

The fruit grows from a very strong heartwood called *kamagong*, which is related to ebony. It is often used for high-quality furnitute.

*(Photo courtesy of www.growmedical420.com)*

## 2. Seeded Breadfruit (*Artocarpus camansi* Blanco)

Unlike its cousin breadfruit, camansi contains numerous large brown seeds. The flesh is cooked as a vegetable, often with coconut milk. The seeds are either boiled or roasted, which tastes nutty and delicious.

The tree can reach up to 40 m high. It contains both male and female inflorescences. The fruit is usually 10-15 cm long.

*(Photo courtesy of bucaio.wordpress.com)*

## 3. Katmon (*Dillenia philippinensis* Rolfe)

The *katmon* fruit is similar to its cousin elephant apple. Indians use the elephant apple for curry dishes and chutney. However, local Filipinos rarely eat the fruit.

The fruit is ovoid and yellow-green when ripe. The soft acidic flesh may be eaten raw, used for flavoring dishes, or for sauce, jams, and jellies.

### 4. Galo (*Anacolosa frutescens* Blume)

Galo is a small round light green fruit 2-3 cm long, with a thick, sweet, soft, yellow flesh and a white kernel inside a thin shell. The flesh is eaten raw while the kernel is either boiled or roasted.

It grows from a medium-sized tree that can reach up to 15m. It can be propagated by seed but is mostly cleft-grafted. The grafted plants can bear fruit in 3-5 years.

### 5. Lipote (*Syzygium curranii*)

The fruits grow in clusters, each up to 20mm in diameter. They are round, dark red to black, dry, and pleasantly acidic. It can be made into preserves, wine, pickle, beverages and jelly. It is a good source of protein.

It is a mid-sized tree of up to 15m. The leaves are simple, oblong, dark green, and shiny. Flowers are small, whitish, and in large clusters. It is usually propagated by seed but can be cleft-grafted.

### 6. Pili (*Canarium ovatum* Engl)

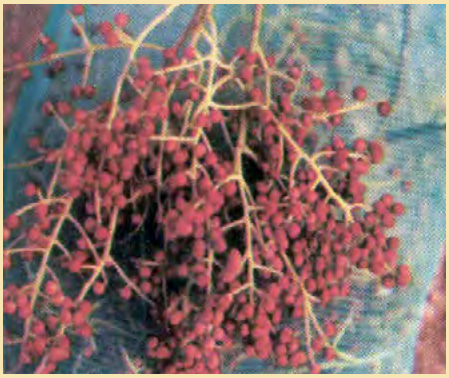
The Philippines is the only country that produces and processes pili nuts commercially. The pulp may be boiled and eaten with salt or salted fish. Boiled pili pulp resembles sweet potato in texture. The kernel, however, is the most important product. When raw, it tastes like roasted pumpkin seeds. When roasted, it is mild, nutty, and crispy. It is high in potassium, calcium, phosphorus, fats, and protein.

Its tree is dioecious up to 25 m high. It is often propagated by seed but can be cleft-grafted. Grafted plants bear fruit after 3-5 years.

### 7. Dikay (*Embella philippinensis* A. DC.)

The red fruits may be eaten raw with an acidic test. It can also processed into jam and jelly. The leaves may be used to sour dishes.

Dikay grows from a woody vine. Leaves are simple, dark green, thick, leathery, and smooth. Flowers are small, whitish, and numerous in large inflorescences. It is mostly propagated by seed, bearing fruit in 4-5 years.



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City: _____ Postcode: _____

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Name: _____

Designation: _____

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I/We wish to join TFNet as:

[ ] Country Member
[ ] Associate Member
[ ] Ordinary Member

Membership Fees per calendar year
(as of 20 Aug 2009)

- Country Members: USD 5,000 (one time)
- Associate Members: USD 500
- Ordinary Members: USD 50

Payment by International Bank Draft payable to

Account name: **International Tropical Fruits Network**
Account number : **A/C No. 7121-4700-0396**
Bank address: Malayan Banking Berhad
No. 231-233, Jalan 18/23, Taman Sri Serdang,
43300 Seri Kembangan, Selangor, Malaysia

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**For more information, contact us at info@itfnet.org or tweet us at @TFNet.**

The International Tropical Fruits Network (TFNet) is committed to the sustainable development of the global tropical fruit industry in relation to production, consumption and trade. It is set up under the auspices of the Food and Agriculture Organization of the United Nations.

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