



Mango Gower's Summit, September 28, 2021

Hilton Daytona Beach Oceanfront Resort, 100 North Atlantic Avenue, Daytona Beach, FL 32118.

Dear Mango Growers:

We are inviting you to attend to the Mango Growers Summit 2021 at the Hilton Daytona Beach Oceanfront Resort, 100 North Atlantic Avenue, Daytona Beach, FL 32118.

The mango industry started in Florida more than 100 years ago. Today, mango is grown primarily in south Florida. In 2013, Florida's mango acreage was in Miami-Dade County with 600 acres, concentrated between May to September. The remainder of mango acreage is in Lee, Palm Beach, and other counties with an appropriate climate. The mango continues to grow in importance in the local market due to interest in the local food movement and the poor quality of imported mangos. These have led to an interest in new mango plantings in Dade County. For small-scale specialty mango production in south Florida, growers must be actively seeking alternative markets to increase their profitability.

Florida State Horticultural Society will hold the Mango Grower's Summit, a 1-day event, as part of the 134th Annual Meeting of the Florida State Horticultural Society to be held September 26 to 28, 2021. The mango growers have the benefit to attend to all the lectures during the FSHS meeting. This is an opportunity to network with growers and to take an in-depth look at quality mango production.

The FSHS conferences are open to the mango growers for more information. please visit: <https://fshs.org/meetings/>

Free Admission for mango farmers, sponsored by National Mango Board.

Registration is required, please contact Wanda Ramos wramos@mango.org Cell: 321-947-3629

AGENDA

Opens 9:00 Registration

12:00 Lunch

1:20 p.m. Welcome

1: 30 p.m. **The National Mango Board and the United States Mango Market**

R. Ward¹, M. Michel² L. Ortega² and R. Mitton²

1:45 p.m. **Mango Internal Discoloration (“Cutting Black” or “Corte Negro”)**. Jeffrey K. Brecht, University of Florida, IFAS, Horticultural Sciences Department, Gainesville, FL, USA.

2:00 p.m. **‘Rapoza’ A Potential Mango Cultivar for the Americas**, Noris Ledesma^{1*}, Hervert Yair Ordoñez

2:15 p.m. **Developments Mango breeding side of the project**, Alan Chambers, Tropical Research and Education Center | Horticultural Sciences Dept | University of Florida

2:30 pm **A Review of Asam Kumbang (*Mangifera quadrifida* Jack.)**, Noris Ledesma¹, M. Hanif Micaksono², ¹ Tropical Research & Education Center, University of Florida/IFAS, Homestead, Florida., ² Tunas Meratus, Gambah Luar Muka, South Kalimantan, Indonesia.

2:45 pm **Mango Collection at Fruit and Spice Park**, Louise King, Fruit and Spice Park.

3:00 pm **Expanding mango consumption Phase 1: mango (*Mangifera indica*) cultivar evaluation for the National Mango Board**, Jonathan H. Crane, University of Florida/IFAS, Tropical Research and Education Center, Homestead, Florida

3:15 pm — Mango Forum

Abstracts:

The National Mango Board and the United States Mango Market

R. Ward¹, M. Michel² L. Ortega² and R. Mitton²

¹Food & Resources Economics, University of Florida; ²National Mango Board

Abstract.

The National Mango Board (NMB) is a national promotion and research organization authorized by the United States Congress and approved by the U.S. Department of Agriculture in 2004. The NMB is entirely supported by assessments from domestic and imported mangos and does not rely on any taxpayer dollars or government funding. The board’s mission is to increase the consumption of fresh mango in the U.S. by inspiring consumers and educating them about the culture, flavor, and nutrition of mangos, while bringing the industry together.

The NMB accomplishes its mission through four main programs: marketing, communications, research, and industry relations. The marketing and communications programs target consumers along with [retailers](#), [foodservice](#), nutritionists and other key audiences with information about selection, ripening, cutting, varieties and nutrition, along with great recipes. The research and industry relations programs help the entire mango supply chain deliver a [quality product](#) to the U.S. consumer through research and extension meetings to [educate](#) and inform growers, shippers, packers, importers, retailers and others. The NMB’s research program also investigates the phytonutrient properties of mango and conducts studies on the potential health benefits of mango.

From 2005 to 2020, the mango import volume into the U.S. increased by 110% (from 260,841.9 MT to 549,210,6 MT) with the highest volume exporting countries being Mexico, Peru, Ecuador, Brazil,

Guatemala, and Haiti. The per capita mango availability has increased by 93%, from 1.88 pounds to 3.63 pounds per person. Regarding retail sales, the mango category has increased from \$109 to \$262 per store per week; and the volume per store per week has increased from 132 to 261 units of whole mango per store per week. Regarding the impact of NMB promotion on mango consumption, the most recent analysis conducted from February 2013 to June 2019 indicates that the NMB programs are responsible for 22% of the increase in sales at the FOB level with a return on investment of 12.54 to 1.

Mango Internal Discoloration (“Cutting Black” or “*Corte Negro*”).

Jeffrey K. Brecht¹, Bruce Schaffer², Jonathan Crane², Yuncong Li², Ana Vargas², Johana Ramirez Mogollón³, Ricardo Moreira Macías⁴, and Vincente Alvarez⁴

¹University of Florida, IFAS, Horticultural Sciences Department, Gainesville, FL

²University of Florida, IFAS, Tropical Research & Education Center, Homestead, FL

³Asociación Peruana de Productores y Exportadores de Mango (APEM)

⁴Fundación Mango del Ecuador (FME) and Instituto Nacional de Investigaciones Agropecuarias (INIAP)

Internal discoloration (“cutting black” or “*corte negro*”) is a physiological disorder of mango fruit that may be induced preharvest but is expressed postharvest. *Corte negro* is characterized by diffuse brown or gray-to-black flesh discoloration in partially ripe to ripe fruit. It has been observed in all common mango cultivars imported to the U.S. from Mexico, Central America, and South America. We conducted trials over three or four seasons depending on location at two farms in Ecuador with ‘Tommy Atkins’ and ‘Ataulfo’ (‘Honey’) and two farms in Peru with ‘Kent’ mangos; a single trial with ‘Honey’ mangos at a third farm in Peru with a history of *corte negro* was included in the fourth year. We tested the hypothesis that mangos become predisposed to develop *corte negro* symptoms at some critical period of fruit development due to low Ca and/or high N. We further tested the hypothesis that *corte negro* symptoms develop in response to stress from either the USDA APHIS phytosanitary hot water treatment or postharvest chilling temperature (storage at 10°C versus 24°C). Our attempts to either induce or prevent induction of *corte negro* by manipulating N and CA application rates had no effect on the incidence of *corte negro*. A possible role for quarantine hot water treatment in development of *corte negro* was disproven in the first two seasons of research. However, we established that *corte negro* occurred almost exclusively in fruit from refrigerated storage (3 weeks@10°C plus 1 week@24°C) with no difference among fertilizer treatments.

‘Rapoza’ A Potential Mango Cultivar for the Americas.

Noris Ledesma^{1*}, Hervert Yair Ordoñez², ¹ Tropical Research & Education Center, University of Florida/IFAS, Homestead, Florida., ² University of Pedro Ruiz Gallo-Lambayeque, Peru

‘Rapoza’ is a large, high-quality mango cultivar (*Mangifera indica* L.) selected by Dick Hamilton of the University of Hawaii in the 1970s, progeny of ‘Irwin’ It produces large, attractive, excellent quality large red fruits weighing average 650 g. with desirable characteristics for a commercial mango. It is generally late bearing under South Florida conditions, where the fruit matures over a long period, mid-July to October. It has good flavor, excellent disease resistance and good appearance. Trees are vigorous and productive with a rounded canopy. ‘Rapoza’ has gaining an attention in the past decade as a red mango alternative in the Americas with particular interest in Peru. ‘Rapoza’ has been

introduced to Peru in 2010 and trees has been evaluated in different regions of the Sechura desert, located south of Piura, Peru. It bears regularly and sets well. Preliminary data of performance of 'Rapoza' under Sechura desert is provided, including some management headlines of orchards and yield.

A Review of Asam Kumbang (*Mangifera quadrifida* Jack.), Noris Ledesma¹, M. Hanif Micaksono², ¹ Tropical Research & Education Center, University of Florida/IFAS, Homestead, Florida., ² Tunas Meratus, Gambah Luar Muka, South Kalimantan, Indonesia.

The mango, *Mangifera indica* L. (Anacardiaceae), is the best known and most widely cultivated species in the genus *Mangifera*. An endemic specie to Malaysia and commonly known as a Rancha-rancha, Asam Kumbang. *Manguifera quadrifida* is an ultra-tropic specie than grows in undisturbed lowland forest, often in inundated land or along riversides. Often tribal and local people use it raw or ripe and for medicinal purposes. There is an increasing interest for conservation by Ex-situ and In-situ conservation but currently is the IUCN red listed species. *M. quadrifida* has potential for breeding to improve mangos and produce new hybrids with reduced susceptibility to disease, that may naturally flower in the tropics with no induction. A general review, recording experiences with local communities in Borneo, and horticultural remarks includes their adaptability to modern cultivation and potential as a commercial crop.

Developments Mango breeding side of the project, Alan Chambers, Tropical Research and Education Center | Horticultural Sciences Dept | University of Florida

Mango is a species that is rich in diversity, but biological constraints limit efficient plant improvement through breeding. Most mango cultivars today have been the result of chance seedlings grown by mango enthusiasts in contrast to most crop cultivars that result from intentional plant breeding. Mango flower biology is one factor impacting this outcome. Thousands of mango flowers are borne on individual panicles, but few pollinated flowers will result in a mango fruit. As a result, controlled hybridization using elite parents has been challenging as most flowers abort prior to embryo formation. Alternative strategies to hand pollination include selecting half-sibling populations where only the maternal parent is known, or caging mature trees with insect pollinators to achieve a higher proportion of progeny with know parentage. The recent publication of two mango genomes and an efficient genotyping platform have enabled a new discovery tool for selecting mango hybrids. In total, 140 parental cultivars and 575 mango seedlings from 11 maternal parents were genotyped using 365 single nucleotide polymorphism markers. The 11 maternal parents included 'Duncan', 'Edward', 'Glenn', 'Haden', 'Lemon Zest', 'Palmer', 'Pruter', 'Ruby', 'Tommy Atkins', 'Van Dyke', and 'Young'. Seedling genotypes were sorted using the known, maternal parent and "impossible SNPs" were used to identify the most probable paternal parent. Selfing rates from 2% ('Duncan') to 40% ('Tommy Atkins') were recorded. The planting design of the mango collection also enabled the localization of paternal trees in relation to the maternal parent. For 'Glenn' mango, for example, 91 seedlings were genotyped successfully, and pollination did not appear to be correlated with proximity to the maternal tree. This might be informative for identifying insect pollinators of mango. Comparing and contrasting trends from all populations can inform cultivar-level differences for selfing rate and paternal pollinator preferences. This could inform mango planting strategy in the future. Finally, the genotyping results enabled the selection of mango seedlings with known parentage and are leading to the development of new mango cultivars with novel trait combinations.

Mango Collection at Fruit and Spice Park, Louise King, Fruit and Spice Park.

The Fruit & Spice Park is a 37-acre botanical garden in Homestead, Florida that is operated by the Miami-Dade County Parks, Recreation and Open Spaces Department. The Park is the only ethnobotanical park in the United States, and it contains more than 500 species of economically and culturally significant plants from five tropical and subtropical regions around the world. It showcases rare plants and educates the public on the connection to and reliance on the plant world on which we all depend, and it serves as a repository of cultivars for area growers and residents. Within the park there are several large collections of cultivars of species with commercial interest: annona, avocado, banana, bamboo, lychee, and mango. The Parks mango collection more than 180 different cultivars, some of whose introduction to the park dates back to the 1980's. This valuable collection is a delight to visitors each summer, and it serves as a valuable source of germplasm for the research community.

Expanding mango consumption Phase 1: mango (*Mangifera indica*) cultivar evaluation for the National Mango Board, Jonathan H. Crane, University of Florida/IFAS, Tropical Research and Education Center, Homestead, Florida

Growing, producing, and marketing the right cultivar or cultivars has a critical impact establishing, maintaining, and expanding the fresh fruit business in the western hemisphere. The international fresh mango fruit business is no different. Although the major cultivars in the trade, i.e., 'Tommy Atkins', 'Keitt', 'Kent', 'Haden' 'Madame Francis' and 'Ataulfo' possess many of the attributes of successful commercial cultivars, they all have their drawbacks. The fresh fruit mango trade in the western hemisphere is expanding and the market seems poised to accept new peel colors, shapes, sizes and flavors. However, establishing sufficient production and marketing of new cultivars can be a daunting task. There are major production, handling-postharvest, transport, and marketing considerations, which need to be worked out as much as possible if a new cultivar is to be successfully introduced. An initial step is for the mango industry to review a range of potential cultivars that have the attributes necessary for commercialization. The purpose of this report is to offer the results of a panel of nine international mango experts assembled as a part of a National Mango Board sponsored project to identify mango cultivars with potential for commercialization to enhance the international mango industry on this continent.

National Mango Board Tools for the Mango Industry

R. V. Mitton¹; M. Michel¹; L. Ortega¹ and CTS²

¹National Mango Board, U.S.A; ²Food Safety Consulting & Training Solutions LLC

The research & industry relation program of the National Mango Board helps the entire mango supply chain deliver a quality product to the U.S. consumer through research and extension meetings to help educate growers, shippers, packers, importers, retailers, and others. This program is divided into sub-programs that address key concerns of the mango industry. One such sub-program is the Food safety and sustainability, which aims to provide through various tools scientific-based information to the mango industry to enhance the safety of mangos in the U.S. and engage producers, packers, and other members of the mango industry in reducing their environmental and social footprints with easy-to-implement sustainability practices. These tools are versatile and are encompassed into both the mango food safety and mango sustainability websites. What is food safety? how to deal with physical, chemical, and biological risk factors within the facility or farm? How sustainable is the farm and/or packing house? How to become more sustainable? How to create and implement an action plan that will lead to better sustainable practices? Both holistic and detailed answers are provided within these websites and are available for download on smartphone, tablets, and computer devices at no cost.

These tools are didactic and can be used to train and educate all personnel on the good manufacture and agricultural practices as well as the value and benefits of adopting sustainable practices.