Tapping into the wealth of local banana diversity: The 10 most popular varieties in markets across the world

Rachel Chase, Miguel Dita, Aman Omondi, Beatrice Ekesa, Sijun Zheng, Nicolas Roux

XII International Symposium on Banana: Celebrating Banana Organic Production, Angers, France

15 August, 2022
Problem: Cavendish monoculture

2018 Global Production
57% Cavendish
15% Plantain
15% Highland & other cooking
13% Other dessert types

- From Lescot (2020). *Banana Genetic Diversity*, Fruitrop Magazine n°269
Solution: Beyond Cavendish

- Wide diversity exists but is decreasing worldwide (ref. Fruitrop)
- Diversity can keep pest and disease under control (e.g. high diversity in Indonesia minimizes impacts of P and D (pers comm Agus Sutanto))
- Success of new or improved cultivars depends on acceptance/marketability
- Local cultivars preferred by consumers are part of the solution
MusaNet – since 2011

Global collaborative framework for Musa-related research – implementing the Global Musa Strategy

Covering the all disciplines in banana research with over 100 member scientists and over 60 national and regional collections

7 thematic groups: Conservation, Diversity, Evaluation, Genomics, Information, Production Systems and Value Chains

www.musanet.org
Top varieties survey

Survey of the top 10 varieties in the market in **50 countries** in Asia and Pacific, Africa and Latin America and the Caribbean

- 392 different cultivars
- 23 different subgroups
- 9 different genome groups

Data by region

- MusaLAC: 28%
- MusAfrica: 27%
- BAPNET: 45%

MusaNet Regional Networks
MusaNet regional characterization and documentation workshops

Cameroon, 2015

Uganda, 2016

Malaysia, 2017

Costa Rica, 2018

Tahiti, 2023
## Top 10 *Musa* varieties in Colombia

*Alvaro Caicedo Arana*

<table>
<thead>
<tr>
<th></th>
<th>Common name</th>
<th>Genotype/Subgroup</th>
<th>Particular trait of interest</th>
<th>Production area (ha y tonnes/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Harton</td>
<td>AAB - Plantain</td>
<td>Climas cálidos (0-1000 msnm), 4-5 manos</td>
<td>PLT. 415.000ha 65.000 (15%)</td>
</tr>
<tr>
<td>2</td>
<td>Dominico Harton</td>
<td>AAB - Plantain</td>
<td>Clima medio calido (800-1700), 5-9 manos</td>
<td>275.000 (65%)</td>
</tr>
<tr>
<td>3</td>
<td>Dominico</td>
<td>AAB - Plantain</td>
<td>Climas medios frios (1000-2000) 10-14 manos</td>
<td>40.000 (10%)</td>
</tr>
<tr>
<td>4</td>
<td>Pompo / Comino</td>
<td>AAB - Populou</td>
<td>Agroindustria – Chips, patacones, fritos.</td>
<td>20.000 (7%)</td>
</tr>
<tr>
<td>5</td>
<td>Cachaco / cuatro filos</td>
<td>ABB - Bluggoe</td>
<td>&lt;sigatoka, &lt;sigatoka, hoja para envoltura</td>
<td>15.000 (3%)</td>
</tr>
<tr>
<td>6</td>
<td>Banano Común</td>
<td>AAA - Gros Michel</td>
<td>Fusarium, Calidad: Sabor y textura.</td>
<td>BAN. 80.300ha 26.240 (33%)</td>
</tr>
<tr>
<td>7</td>
<td>Banano Cocos y otros.</td>
<td>AAA - Gros Michel</td>
<td>Porte mas bajo (altura)</td>
<td>6.560 (8%)</td>
</tr>
<tr>
<td>8</td>
<td>Banano Valery</td>
<td>AAA - Cavendish</td>
<td>Exportación. Fusarium-R4</td>
<td>35.500 (44%)</td>
</tr>
<tr>
<td>9</td>
<td>Banano Williams</td>
<td>AAA - Cavendish</td>
<td>Exportación. Fusarium-R4</td>
<td>12.000 (15%)</td>
</tr>
<tr>
<td>10</td>
<td>Bananito - Bocadillo</td>
<td>AA - Sucier</td>
<td>Sigatoka, sequia,</td>
<td>2.587 (16.200tn)</td>
</tr>
</tbody>
</table>
## Top 10 *Musa* varieties in Thailand

**Penchan Suthanukool**

<table>
<thead>
<tr>
<th></th>
<th>Common name</th>
<th>Genotype/Subgroup</th>
<th>Particular trait of interest</th>
<th>Production area (ha)</th>
<th>Volume (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Klaui Namwa</td>
<td>ABB</td>
<td>Fresh Fruit, Sweet, Processing</td>
<td>52,553</td>
<td>184,251</td>
</tr>
<tr>
<td>2</td>
<td>Klaui Khai</td>
<td>AA</td>
<td>Fresh Fruit, Processing</td>
<td>10,117</td>
<td>32,159</td>
</tr>
<tr>
<td>3</td>
<td>Klaui Hom</td>
<td>AAA</td>
<td>Fresh Fruit, Processing</td>
<td>9,960</td>
<td>30,082</td>
</tr>
<tr>
<td>4</td>
<td>Klaui Tani</td>
<td>BB</td>
<td>Leaf, Handmade</td>
<td>2,687</td>
<td>8,290</td>
</tr>
<tr>
<td>5</td>
<td>Klaui Lebmunang</td>
<td>AA</td>
<td>Fresh Fruit, Processing</td>
<td>1,498</td>
<td>3,426</td>
</tr>
<tr>
<td>6</td>
<td>Klaui Hin</td>
<td>ABB</td>
<td>Fresh Fruit, Feed</td>
<td>247</td>
<td>87</td>
</tr>
<tr>
<td>7</td>
<td>Klaui Hakmuk</td>
<td>ABB</td>
<td>Grill, Processing</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>8</td>
<td>Klaui Nak</td>
<td>AAA</td>
<td>Fresh Fruit</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>9</td>
<td>Klaui Tepparot</td>
<td>ABBB</td>
<td>Leaf</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>10</td>
<td>Klaui Nangpraya</td>
<td>ABB</td>
<td>Food/Processing</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
### Asia and Pacific

#### India

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<tr>
<td>1</td>
<td>Poovan</td>
<td>AAB/Mysore</td>
<td>Wilt resistance</td>
</tr>
<tr>
<td>2</td>
<td>Rasthali</td>
<td>AAB/Silk</td>
<td>Mealy pulp and apple flavour</td>
</tr>
<tr>
<td>3</td>
<td>Thellachakkarakeli</td>
<td>AAA</td>
<td>good taste, rich in carotenoids (Pro Vitamin A)</td>
</tr>
</tbody>
</table>

#### Papua New Guinea

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<th>Production</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Large Kalapua</td>
<td>ABB</td>
<td>Tolerant to drought/good starch content, blends well with sago</td>
<td>10 tonnes/ha</td>
</tr>
<tr>
<td>2</td>
<td>Dwarf Kalapua</td>
<td>ABB</td>
<td>Dwarf variant, drought tolerant</td>
<td>6 tonnes/ha</td>
</tr>
<tr>
<td>3</td>
<td>Daru</td>
<td>ABB</td>
<td>Tolerant to drought/flood/salinity</td>
<td>10 – 15 tonnes/ha</td>
</tr>
</tbody>
</table>
## Africa

### Uganda

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<th>Common name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1 Mbwazirume</td>
<td>AAA/EAHB</td>
<td>Cooking, big bunch, commercial</td>
</tr>
<tr>
<td>2 Kibuzi</td>
<td>AAA/EAHB</td>
<td>Cooking, big bunch, big fingers, compact</td>
</tr>
<tr>
<td>3 Enyeru</td>
<td>AAA/EAHB</td>
<td>Cooking, medium fingers</td>
</tr>
</tbody>
</table>

### Cameroon

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<th>Common name</th>
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<th>Particular trait of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Batard</td>
<td>AAB/Plantain</td>
<td>Intermediate French plantain; pounded, fried, flour, roasted, boiled,</td>
</tr>
<tr>
<td>2 Big Ebanga</td>
<td>AAB/Plantain</td>
<td>False Horn plantain; pounded, fried, flour, roasted, boiled</td>
</tr>
<tr>
<td>3 French clair</td>
<td>AAB/Plantain</td>
<td>French Plantain; roasted, boiled, fried</td>
</tr>
</tbody>
</table>
## Latin American and Caribbean

### Colombia

<table>
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<tr>
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<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Harton</td>
<td>AAB/Plantain</td>
<td>Warm low climates, 4-5 hands. Export</td>
<td>65,000 ha</td>
</tr>
<tr>
<td>2 Dominico</td>
<td>AAB/Plantain</td>
<td>Most consumed cultivar, medium warm climate, 5-9 hands</td>
<td>275,000 ha</td>
</tr>
<tr>
<td>3 Dominico</td>
<td>AAB/Plantain</td>
<td>Cold medium climates, 10-14 hands</td>
<td>40,000 ha</td>
</tr>
</tbody>
</table>

### Costa Rica

<table>
<thead>
<tr>
<th>Common name</th>
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<th>Particular trait of interest</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Datil (Pisang mas)</td>
<td>AA/Sucrier</td>
<td>Local consumption/ export</td>
<td>3000 ha</td>
</tr>
<tr>
<td>2 Gros Michel</td>
<td>AAA/Gros Michel</td>
<td>Local consumption</td>
<td>3000 ha</td>
</tr>
<tr>
<td>3 Pelipita</td>
<td>ABB</td>
<td>Local consumption</td>
<td>1000 ha</td>
</tr>
</tbody>
</table>
Examples of transcontinental use of cultivars

Yangambi Km 5 (AAA/Ibota) – Originated in DRC, now a popular variety in Brazil with resistance to Sigatokas and Fusarium Race 1

Bira (AAB/Iholena) – Originated in PNG, popular in Burundi for its high Pro-vitamin A content
The International *Musa* Germplasm Transit Centre (ITC)

- Established in 1985 and hosted by the Katholieke Universiteit Leuven, Belgium
- Holds ‘in trust’ under the FAO the world’s largest collection of banana
- Currently comprises 1,682 accessions *in vitro*, sourced from 38 countries
The ITC’s role

- conserve and safely backup global banana diversity in perpetuity (in vitro and in cryo)

- a transit centre through which germplasm is cleaned of viruses and freely shared among countries.

⚠️ Only 15% of the varieties in the top 10 survey are conserved at the ITC
MGIS – *Musa* Germplasm Information System

31 collections currently share accession-level data on collection location, morphological and molecular characterization, evaluation, and related publications.

Goal: accession-level information for 60 collections

[www.crop-diversity.org/mgis](http://www.crop-diversity.org/mgis)
Diversity catalogue

In 2022/2023, online publication of a non-technical catalogue showcasing local banana diversity across the globe.

Focus will be on traits of interest (e.g. pest and disease resistance and post-harvest information).

Example of similar catalogue from Peru, soon to be published.
Conclusion

• Cavendish monoculture is dominating the banana market for export – but also in local markets in some regions

• Local diversity is disappearing worldwide

• Less diversity -> more pesticides/fungicides needed -> less organic banana production

• Researchers and breeders need more information on varieties preferred in the local markets in order to make alternatives to Cavendish more marketable/accepted

• Varieties can also be useful in countries other than where they originated

• We gathered data on the top 10 varieties in the local markets from 50 countries to showcase local diversity in a catalogue that will provide information on pest and disease resistance and other traits of interest.
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Hamza A. Azali
Girma Kebede
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Johnson Kwach
Modeste Kachapila
Babita Dussouth
Sunday Akinyemi
Delphine Amah
Sveta Gaidashova
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Sedrach Muhangi
Abdallah Salim
Ferdinand Iraz
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