Overview of YIIFSWA II Database


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YIIFSWA-II Database Analyst
Outline

• **YIIFSWA-II Data Architecture**

• **Breeder Seed Production System**

• **Aeroponics & Hydroponics Systems**

• **NARIS Breeder Seeds Documentation**

• **Activities Dashboard**
YIIFSWA-II Data Architecture
Data Sources

Breeder Seeds Systems
Aeroponics Systems
Hydroponics Systems
Field Activities

Analytical Services

Power BI
Reports and Dashboards
Cloud

Data Factory

SSIS ETL

On-Premise

IITA

2/19/2020

4th YIIFSWA-II Annual Review and planning meeting
.: Tissue Culture Process Flow

- Nodal Cuttings
- Meristem Excision
- Incubation
- Multiplication
- Post Flask

3 - 4 weeks
12 weeks
1 week
8 - 12 weeks
2 weeks

.: Key Processes: Media Preparation, Multiplication (Subculturing).

.: Measures: Volume of Media Prepared*, No. of Plantlets Produced*

.: Line Efficiency: OEE (Overall Equipment Effectiveness) is the gold standard for measuring manufacturing productivity.
Breeder Seed Production System
Highlights of the 2019 Production

In CTCs there was a plantlets (Inputs) of 3,582 to generate 10,729 plantlets

The ratio of number plantlets (Inputs) to number of Plantlets produced in Temporary Immersion Bioreactor system (TIBs) is 1:3.

The highest plantlets multiplication was in the Plantform TIBs 3,994 plantlets were produced in Vivipak as a result of late product delivery
**Breeder Seed Production System**

**Stock Keeping Units (SKU)**

1. **Vivipak**
2. **Test Tubes (CTCs)**
3. **Plastics (CTCs)**
4. **Setis (TIBs)**
5. **Plantform (TIBs)**
Breeder Seed Production System

Production of Convention Tissue Culture by Genotype
- No Plantlets (Inputs)
- No Plantlets Produced

- Kpamyo: 1.5K
- Asiedu: 0.8K
- Swaswa: 0.8K
- Others: 0.5K

Production in Temporary Immersion Bioreactor System by SKU (Inputs)
- No Of Plantlets (Inputs)
- No Of Plantlets Produced

- Plantform: 5.8K
- Plastic: 1.5K
- Test Tube: 0.8K

2/19/2020 4th YIIFSWA-II Annual Review and planning meeting
Breeder Seed Production System

Plantlets Stock Usage

Materials generated in Plantform reached 17,770 which is about 60% of the usage.

Minimum monthly production of 690 plantlets and Maximum was reached 2135 plantlets.

<table>
<thead>
<tr>
<th>Month</th>
<th>Plantform</th>
<th>Plastic</th>
<th>Test Tube</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1735</td>
<td>758</td>
<td>91</td>
<td>2584</td>
</tr>
<tr>
<td>February</td>
<td>1300</td>
<td>971</td>
<td>87</td>
<td>2358</td>
</tr>
<tr>
<td>March</td>
<td>1450</td>
<td>860</td>
<td>123</td>
<td>2433</td>
</tr>
<tr>
<td>April</td>
<td>690</td>
<td>452</td>
<td>16</td>
<td>1158</td>
</tr>
<tr>
<td>May</td>
<td>1790</td>
<td>354</td>
<td>552</td>
<td>2696</td>
</tr>
<tr>
<td>June</td>
<td>1642</td>
<td>831</td>
<td>366</td>
<td>2839</td>
</tr>
<tr>
<td>July</td>
<td>1847</td>
<td>693</td>
<td>608</td>
<td>3148</td>
</tr>
<tr>
<td>August</td>
<td>2135</td>
<td>429</td>
<td>260</td>
<td>2824</td>
</tr>
<tr>
<td>September</td>
<td>917</td>
<td>1105</td>
<td>354</td>
<td>2376</td>
</tr>
<tr>
<td>October</td>
<td>1544</td>
<td>563</td>
<td>757</td>
<td>2864</td>
</tr>
<tr>
<td>November</td>
<td>1777</td>
<td>924</td>
<td>141</td>
<td>2842</td>
</tr>
<tr>
<td>December</td>
<td>943</td>
<td>324</td>
<td>85</td>
<td>1352</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17770</strong></td>
<td><strong>8264</strong></td>
<td><strong>3440</strong></td>
<td><strong>29474</strong></td>
</tr>
</tbody>
</table>

2/19/2020  4th YIIFSWA-II Annual Review and planning meeting
Stock Usage of Plantform Plantlets

Below are proportion and usage of the plantlets collected from Plantform

- Usage (Removals)
  - Contamination
  - Hardening
  - Partners
  - Peers
  - Subculture
  - Vivipack

- Contamination: 14%
- Hardening: 34%
- Subculture: 32%
- Peers: 3%
- Partners: 12%
- Vivipack: 5%
<table>
<thead>
<tr>
<th></th>
<th>Jan - Apr</th>
<th>May - Aug</th>
<th>Sep - Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost (USD)</td>
<td>7921</td>
<td>7994</td>
<td>7914</td>
<td>23828</td>
</tr>
<tr>
<td>Derived Cost (New Price in USD)</td>
<td>0.67</td>
<td>0.65</td>
<td>0.74</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Based on the output of 2018 cost estimation designed with Context

**Note:** Bench Fee at IITA increased by 25% in 2019.

**Plantlets Production Cost =** Cost of plantlets (input) + Media Cost by Volume of Product + Equipment & Machine Cost + Human Resource Cost

<table>
<thead>
<tr>
<th></th>
<th>Unit Cost ($) in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTCs</td>
<td>0.87</td>
</tr>
<tr>
<td>TIBs</td>
<td>0.61</td>
</tr>
<tr>
<td>Culture Media</td>
<td>1.05</td>
</tr>
<tr>
<td>Bench Fee</td>
<td>750</td>
</tr>
</tbody>
</table>
Aeroponics & Hydroponics Systems
Plantlets establishment
The Aeroponics facility at the BIP location of the campus in Ibadan was established for 2 streams cycles.

Total 3,300 plantlets introduced of Kpamyo and Asiedu.

Growth Comparison:
Sources: SAH, TIBS and Regenerate TIBS materials (Aeroponics Rooted Vines)

Harvest of Vines and Mini Tubers
Nursery Experiment
Screen House Management

SAH: Semi Autotrophic Hydroponics
TIBS: Temporary Immersion Bioreactor
Plant Establishment in Aeroponics

Total 3300 plantlets introduced Kpamyo and Asiedu

Sources: (SAH, TIBs and Regenerate TIBs Materials Aeroponics rooted)
Holes Planted by Year and Month

- **2018 November**: 980 (30%)
- **2019 June**: 453 (14%)
- **2019 May**: 103 (3%)
- **2019 April**: 784 (24%)
- **2019 January**: 392 (12%)
- **2018 December**: 588 (18%)

**Date Month**
- 2018 November
- 2018 December
- 2019 January
- 2019 April
- 2019 May
- 2019 June
Vines Production from the Aeroponics

A sum of 96,212 vines were generated

April: 46,407
May: 39,355
October: 5950
November: 4300
Kpamyo AS seedlings growth by Stem position

<table>
<thead>
<tr>
<th>Stem Position</th>
<th>2 Weeks</th>
<th>3 Weeks</th>
<th>4 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>6</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Middle</td>
<td>4</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Top</td>
<td>8</td>
<td>17</td>
<td>27</td>
</tr>
</tbody>
</table>
Asiedu AS seedlings growth by Stem position

![Graph showing growth of seedlings at different stem positions across weeks.](image-url)
Aeroponics System

Average Seedlings Growth by Stem Position

![Graph showing average seedlings growth by stem position](image)
Growth Comparison of Two Genotypes established in the Aeroponics

Asiedu & Kpamyo of different sources

*These observations were only taken for 6 weeks and the were collected at 2 weeks interval
Aeroponics System

Harvest of Mini Tubers from the Aeroponics

<table>
<thead>
<tr>
<th>Month</th>
<th>No. Of Plantlets</th>
<th>No. Of Tubers</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>698</td>
<td>776</td>
<td>8452</td>
</tr>
<tr>
<td>May</td>
<td>656</td>
<td>657</td>
<td>7164</td>
</tr>
<tr>
<td>October</td>
<td>854</td>
<td>854</td>
<td>33067</td>
</tr>
<tr>
<td>December</td>
<td>247</td>
<td>247</td>
<td>9760</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2455</strong></td>
<td><strong>2534</strong></td>
<td><strong>58443</strong></td>
</tr>
</tbody>
</table>
### The effects of the Chiller on the temperature Nutrient solution

#### Average Temperature (C) by Month

<table>
<thead>
<tr>
<th>Years</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>26.5</td>
<td>24.9</td>
<td>28.3</td>
</tr>
<tr>
<td>February</td>
<td>28.8</td>
<td>27.8</td>
<td>29.2</td>
</tr>
<tr>
<td>March</td>
<td>29.2</td>
<td>27.8</td>
<td>28.4</td>
</tr>
<tr>
<td>April</td>
<td>27.2</td>
<td>27.4</td>
<td>27.8</td>
</tr>
<tr>
<td>May</td>
<td>27.5</td>
<td>27.5</td>
<td>27.1</td>
</tr>
<tr>
<td>June</td>
<td>27.1</td>
<td>26.1</td>
<td>26.7</td>
</tr>
<tr>
<td>July</td>
<td>32.2</td>
<td>26.1</td>
<td>27.5</td>
</tr>
<tr>
<td>August</td>
<td>28.9</td>
<td>26.9</td>
<td>28.4</td>
</tr>
<tr>
<td>September</td>
<td>28.7</td>
<td>28.7</td>
<td>28.9</td>
</tr>
<tr>
<td>October</td>
<td>27.3</td>
<td>29.3</td>
<td>28.1</td>
</tr>
<tr>
<td>November</td>
<td>23.8</td>
<td>23.8</td>
<td>25.2</td>
</tr>
<tr>
<td>December</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
</tr>
</tbody>
</table>

The chiller stabilized the nutrient temperature between 23°C - 25°C.
# Harvest of Tubers and Single Node Vines Production by Genotypes

<table>
<thead>
<tr>
<th>Hydroponics system</th>
<th>Genotype(s)</th>
<th>No of Plantlet(s)</th>
<th>No of Tuber (s)</th>
<th>Tuber weight(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Water</td>
<td>Asiedu</td>
<td>36</td>
<td>67</td>
<td>1500</td>
</tr>
<tr>
<td>Drip System</td>
<td>Asiedu</td>
<td>121</td>
<td>312</td>
<td>8594</td>
</tr>
<tr>
<td>Drip System</td>
<td>Kpamyo</td>
<td>258</td>
<td>511</td>
<td>12669</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>415</strong></td>
<td><strong>890</strong></td>
<td><strong>22762</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Genotype(s)</th>
<th>No. of Vines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asiedu</td>
<td>6647</td>
</tr>
<tr>
<td>Kpamyo</td>
<td>1356</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8003</strong></td>
</tr>
</tbody>
</table>
Hydroponics System

Growth comparison in Plants Nodes different substrate over 8 weeks (observations taken at 2 weeks interval)

Key: Substrate - 1 - Cocopeat + Perlite, 2 - Cocopeat + Perlite+Large Pumice, 3 - Cocopeat + Perlite+ Medium Pumice, 4 - Cocopeat + Perlite+Small Pumice
Weather Station
NARIS Breeder Seeds Documentation
NARIS Breeder Seeds Documentation

NRCRI, UMUDIKE

CRI, KUMASI

SARI, TAMALE
Documentation For NARIS in the Breeder Seed production

Conventional Tissue Culture

- Stock Keeping
- Batch Processing
- Labeling adequately
- Reporting
The sheet auto-populates as the partners subculture spreadsheet is filled. And it sums up the production.

<table>
<thead>
<tr>
<th>s/n</th>
<th>Weeks(By Year)</th>
<th>Month</th>
<th>Weeks(By Month)</th>
<th>FirstWeekDay</th>
<th>LastWeekDay</th>
<th>Population Produced</th>
<th>Kpamyo</th>
<th>Asiedu</th>
<th>Swaswa</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>36</td>
<td>Sep</td>
<td>1</td>
<td>2019-09-02</td>
<td>2019-09-06</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>37</td>
<td>37</td>
<td>Sep</td>
<td>2</td>
<td>2019-09-09</td>
<td>2019-09-13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>38</td>
<td>38</td>
<td>Sep</td>
<td>3</td>
<td>2019-09-16</td>
<td>2019-09-20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Documentation Resources Developed for the NARES

**CRI, Kumasi, GHANA**
https://drive.google.com/drive/folders/1F1fehqRpKNsGJBkZAqrHr794bgDD5mqo?usp=sharing

**SARI, Tamale, GHANA**
https://drive.google.com/drive/folders/1xBJPdTVKjm3BZvtv60EZynwd9dNsEdJu?usp=sharing

**NRCRI- Umudike, NIGERIA**
https://drive.google.com/drive/folders/1Ld_4GKAdytrUx5OVCnOr_3A2_CVUg2g6?usp=sharing

**NACGRAB, Ibadan, NIGERIA**
(To be done this year)
<table>
<thead>
<tr>
<th>Reportables Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
</tr>
</tbody>
</table>

**Go to this Sway**
Acknowledgements

BMGF
YIIFSWA – II Team members and Partners

THANK YOU FOR YOUR ATTENTION