Development and Dissemination of Flood Tolerant and *Yellow Vein Mosaic Virus (YVMV)* Resistant Okra Hybrids for Southern Regions in Nigeria

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Design target

Flood tolerant and YVMV resistant okra hybrid with longer shelf life for farmers and consumers

Ugwu Emmanuel is an MPhil scholar at WACCI, University of Ghana. His research interest focuses on improvement and evaluation of early maturing flood tolerant and disease resistant okra for farmers and the Nigerian Market. He holds a BS Agric degree in Crop protection where he opted to do his project in plant breeding and evaluated the photoperiodic activities of thirteen okra *(Abelmoschus esculentus*) genotypes in Nigeria. Upon graduation from WACCI, he plans to partner with private and public seed sectors to release okra hybrids that are resistant to flooding and Yellow Vein Mosaic Virus (YVMV) with longer shelf-life and other desirable traits needed by farmers and consumers.

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Product Profile design team

Step 1

PP Design Team Lead/Champion	Ugwu Emmanuel
	West Africa Centre for Crop Improvement

PP Design Team		
Person	**Area of Expertise**	**Name of organization**
Ugwu Emmanuel	Seed Scientist	University of Nigeria,
Enyi Ikechukwu	Breeder	Nsukka/WACCI, UG
Isiaka Abiodun	Breeder	University of Nigeria,
Ezea Augustus	Plant Pathologist	Nsukka
Chinaka Onyekachi	Plant Entomologist	Federal University Oye-

Step 2

Product profile descriptors	
Product profile name	Flood tolerant and resistant okra hybrids for Nigeria
Crop	Aqua Okra (Abelmoschus esculentus)
Country	Nigeria
Geographic regions	South east, South-South, South
Market segment and positioning	Fresh okra market. Early maturing, flood tolerant, high yielding, disease resistant with prolong shelf-life
Name of target variety to be replaced	Uhie, Clemson, Agwu early **Strength**: **Uhie**- high Resistance to disease. **Clemson Spineless**- early maturing, high yielding and spineless. **Agwu early**-Early maturing **Weakness**: **Uhie**-late maturing, low yield, possess spines. **Clemson spineless**- low disease resistant, short duration, easily affected by flood **Agwu early**- low resistance to pest and disease, low yield
Date PP created	02/03/2023

Target client and use	
Value chain primary clients/customers	Farmers, Market sellers, retailers, transporter and consumers
Market scale	House hold, local and regional
Use	Food (salad, stew, sauces, soup)
Type of processing	None (fresh), cooked
Market class	Small to medium okra

Target crop producers and production system	
Number of farmers	500-1200
% ratio: male to female farmers	42-49% male: 51-58% female
Production system	Open field (off season)
Area of production system	300-455ha
Growth habit	Determinate Okra (erect plant)
Expected level of inputs	Medium-fertilizer, crop protection(low)
Typical yield range of target system	1.6-6t/ha
Cropping system	Continuous monocropping
Mechanization	Mechanized planting, chemical method of weed management and Manual harvesting
Agroecological zone(s)	mangrove and rain forest zone
Total vegetative propagation material market	480-2730kg

Variety technical specification

Step 3

Client/ customer	Driver	Trait category	Preference group: Women (W) Men (M) Youth (Y) W+M+Y (All)	Trait demand classification: *1. Essential/ "must have" 2. Niche opportunity 3. Added-value 4. Winning trait*	Target traits	Trait description (Quantitative measures)	Name of benchmark variety	Performance required compared to benchmark variety <, =, > etc.
Farmer	Productivity	Yield	All	1	Fresh fruit weight	Average fruit weight >40g	Uhie	>
			All	1	1000 seed weight	Seedweight >=1000kg	Clemson	>
			All	1	Number of fruit	Average nber of fruits >1,111,110/ha	Agwu Early	>
		Biotic stress resistance	All	4	Yellow vein Mosaic Virus resistance	1-10 scale: High(7)	Uhie	>=
			All	4	Jassid resistance	Jassid per leaf <1.84	Agwu Early	>
		Abiotic stress tolerance	All	4	waterlogging tolerance	Plant root submerged >15 days	Clemson	>
	Crop management and harvesting	Plant architecture	All	1	Plant height and stem branching	Erect plant with moderate branching, plant height of 65-120 cm	Uhie	<
	Market value and price	Fruit size	All	1	Individual fruit weigth	Average minimum: 40g	Agwu Early	>
		Crop duration	All	1	Early maturing	Sowing to maturity of first fruit: 50 days	Agwu Early	=
	Post-harvest storage	Storage-life	All	4	Longer fruit shelf life	Storage without deterioration>3-6	Agwu early	>
Transporter	Durability and cost	Transportability and storage	M	4	Fruit storage time	Retail quality before deteroriation >3-6 days	Agwu Early	>
Consumer	Satisfaction	Taste	W	3	Palatability (mucilage content)	Mild taste (moderate mucilage content)	Uhie	<
		Appearance	W	1	Pod colour	Dark-green colour pod	Uhie	>
		Shelf-life	All	3	Fruit freshness	Nber of days before wrinkling >3-6 days	Agwu Early	>
Retailer	Sales and profit	Shelf-life	All	4	Longer shelf life without refrigeration	Greater than 3-6 days	Agwu Early	>

A

B

C

Contaminated Yellow Vein Mosaic Virus (YVMV) Okra leave (A) and fruit (B) along with healthy Okra plant and fruit (C)

‘‘Understanding what traits okra farmers and consumers want are critical to plant breeding decisions and seed industries. This is made possible through the Demand-Led Breeding approach which in turns gives rise to product profile that reflects the desires of farmers and consumers”