

TELA Project: An Update

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Outline

- TELA outcome, project partners, duration, and traits
- TELA Team and governance structure
- Results of CFT combined analysis stacked Dt + Bt (MON810)
- Results of CFT combined analysis stacked Dt + Bt (MON89034).
- Results of transgenic NPT, DUS, and multiplication trials
- Summary of trait integration
- Insect Resistance Management
- Summary of Approvals for De-regulation



TELA Project

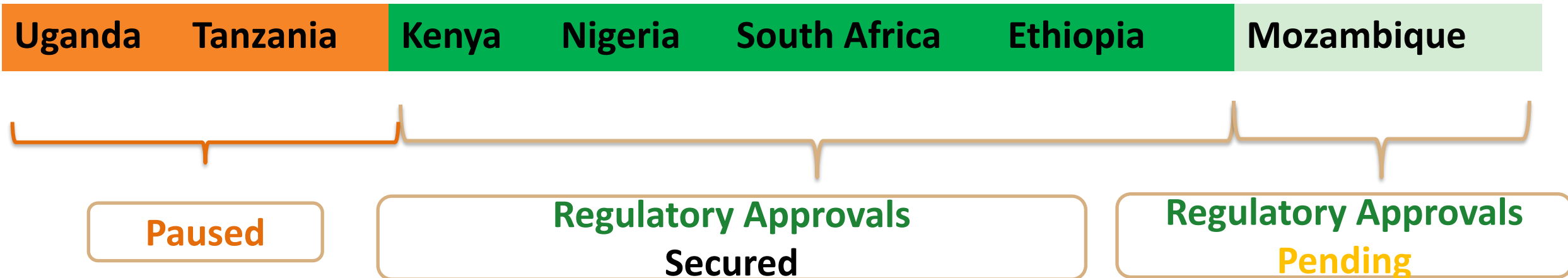
- 1. Expected Outcome:** Secure regulatory approvals and initiate the commercialization of TELA[®] maize hybrids in at least 4 African countries
- 2. Partners:** AATF, Bayer Crop Science, CIMMYT, South Africa, Kenya, Tanzania, Uganda, Mozambique, Uganda; Ethiopia, Nigeria
- 3. Period:** 2018-2024
- 4. Traits:** Bt (MON810 and MON89034); DT (MON87460) and Stack (Bt+DT)



TELA Project Teams

- Executive Advisory Board (EAB)
 - Higher-level guidance to the project
- Operational Committee (OPSCOM)
 - Oversees all Project operations
 - Acts as clearing-house of Project information and documents
- Traits Pipeline and Testing (TPT)
 - Trait introgression into elite lines,
 - develop and test compelling hybrids, and work with other teams to achieve this outcome
- Regulatory, Advocacy and Outreach (RAO)
 - Development, submission, and management of applications to approve the commercialization of transgenic maize hybrids
- Product Launch and Licensing (PLL)
 - TELA Seed Systems and Stewardship Activities Update

Summary of Progress (as of July 2023)



- Regulatory approvals: **Secured** in Kenya, Nigeria, Ethiopia
- Regulatory approvals: **Pending** in Mozambique
- Tanzania and Uganda: activities and funding paused in 2020



Initiating Commercialization: Product Launch



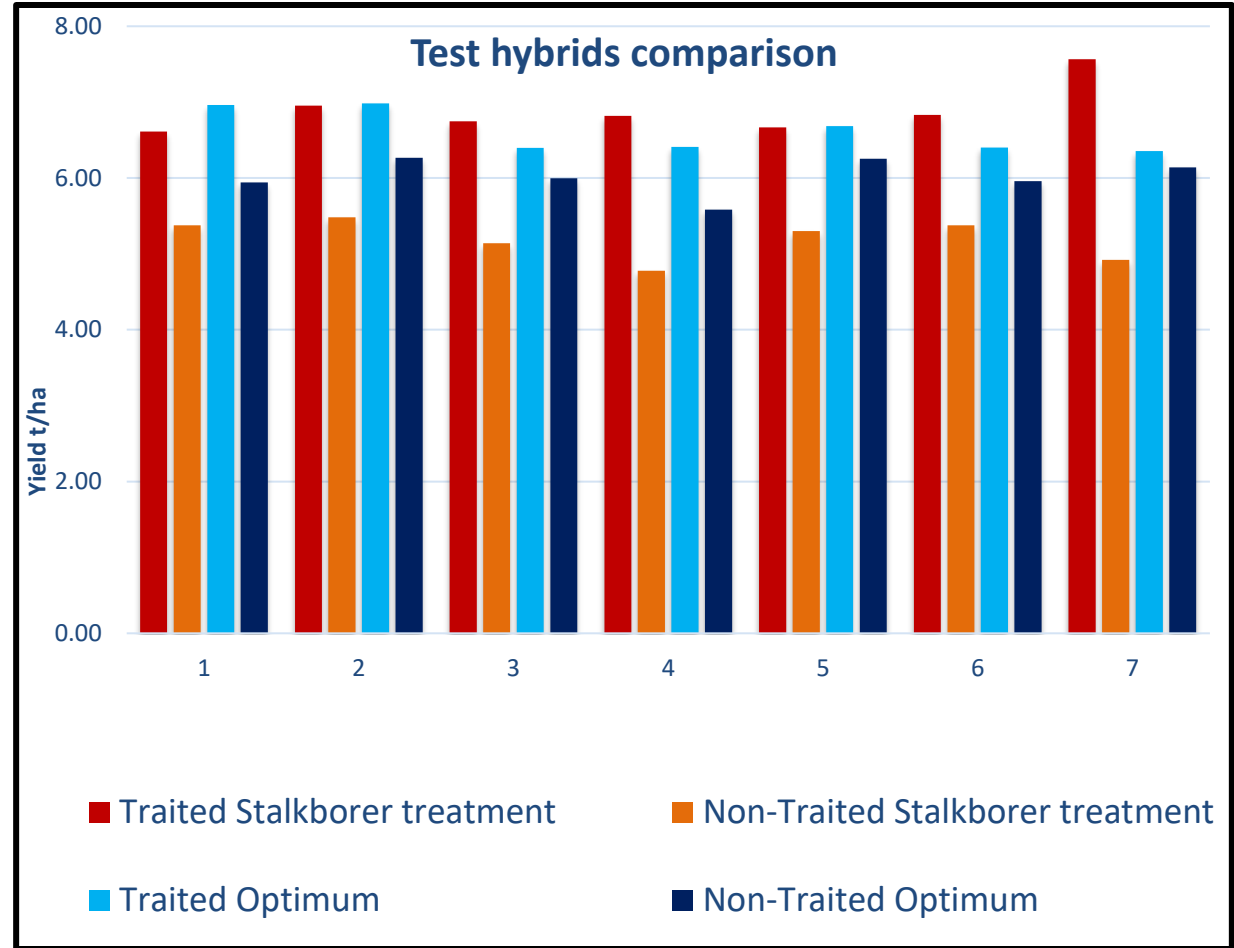
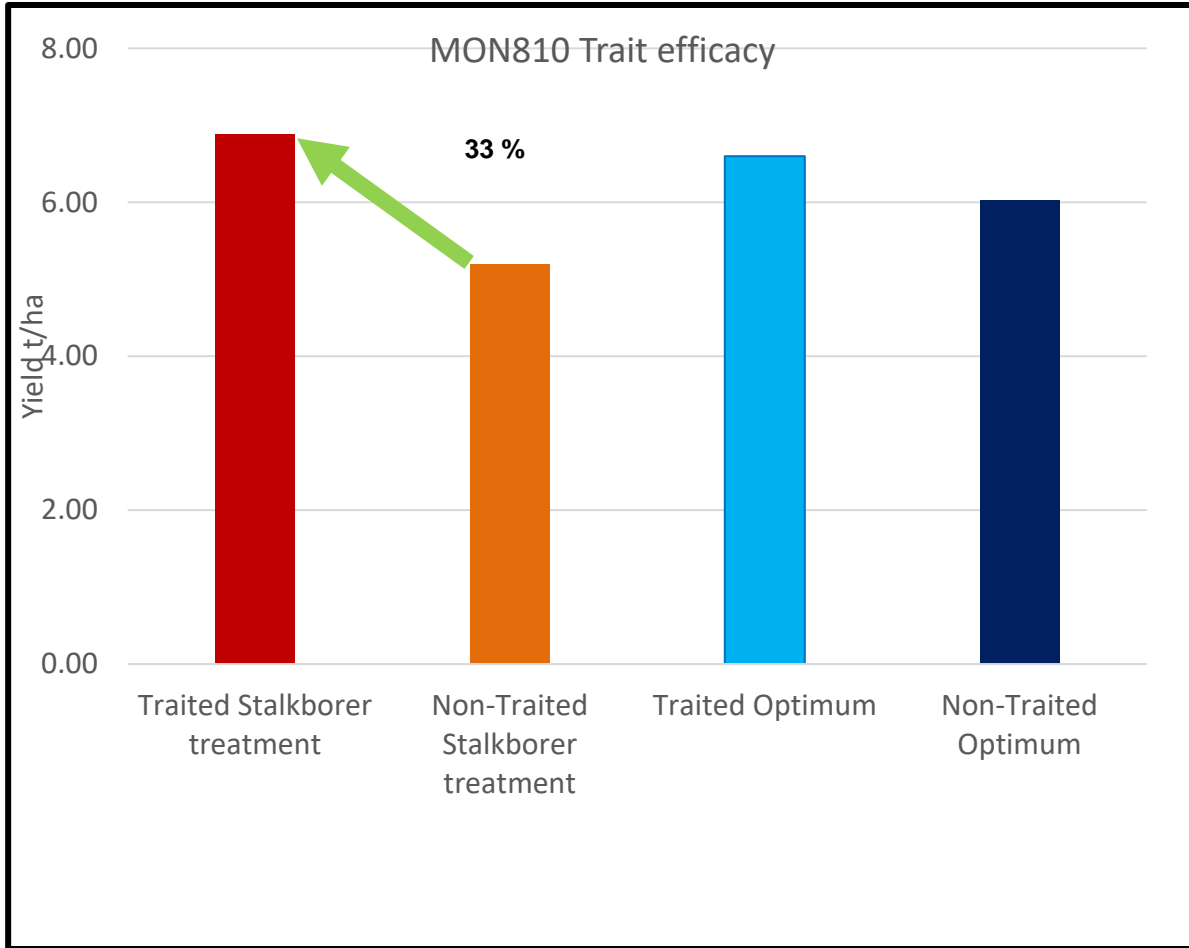
- **Initiating Commercialization:** Trials leading to Variety Release:
 - Kenya: Trials completed and awaiting final approval for Product Launch (PL): **Sep/Oct 2023**
 - Nigeria (NPTs, 2022 & 2023); Anticipated PL: **May/June 2024**
 - Ethiopia (NPTs, 2023 & 2024); Anticipated PL: **May 2025**
 - Mozambique (VCU, Jul 2022 – Apr 2024); Anticipated PL: **Nov 2025**
- **14-Month NCE to Achieve TELA Goal in Year 6**



CFT Summary for DT/Bt Stack

Countries	Location	Years	Treatments
Kenya	Kiboko, Kitale	2016, 2017	Stalk borer (artificial) + FAW (natural)
			Optimum
Uganda	Namulonge	2016, 2017	Stalk borer (artificial) + FAW (natural)
			Optimum
			Drought stress
Tanzania	Makutupora	2017, 2018, 2019	Stalk borer (artificial) + FAW (natural)
			Optimum
			Drought stress
Mozambique	Chokwe	2018, 2019	Stalk borer and FAW (natural)
			Optimum
			Drought stress
Ethiopia	Melkassa	2019	Stalk borer and FAW (natural)
			Optimum
			Drought stress
SA	Hopetown, Lutzville, Malelane	2015, 2017	Stalk borer (natural)
			Optimum

Results of combined analysis stacked Dt + Bt , 2015-2019



Comparison of MON89034 versus non-GM under stem borer artificial infestation, FAW natural infestation and managed drought in Nigeria CFT, 2020-2021

Hybrids

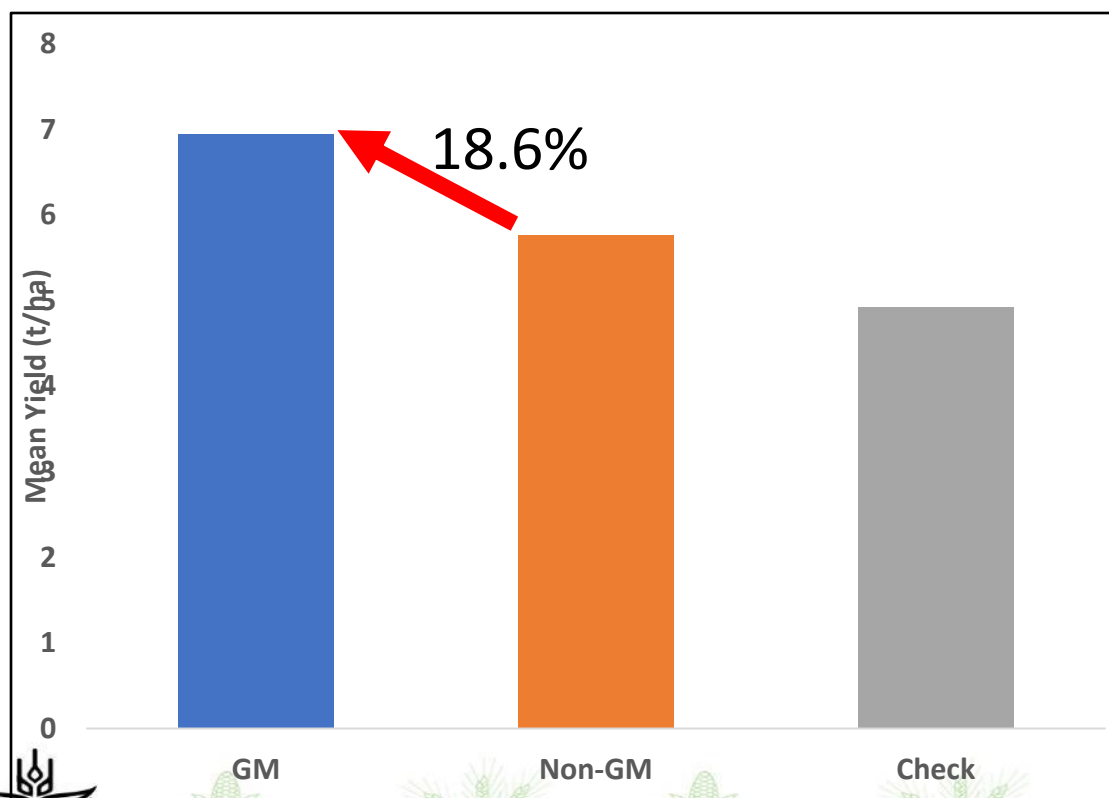
- 7 Bt hybrids; 7 Non-Bt hybrids and 2 commercial check

Treatment

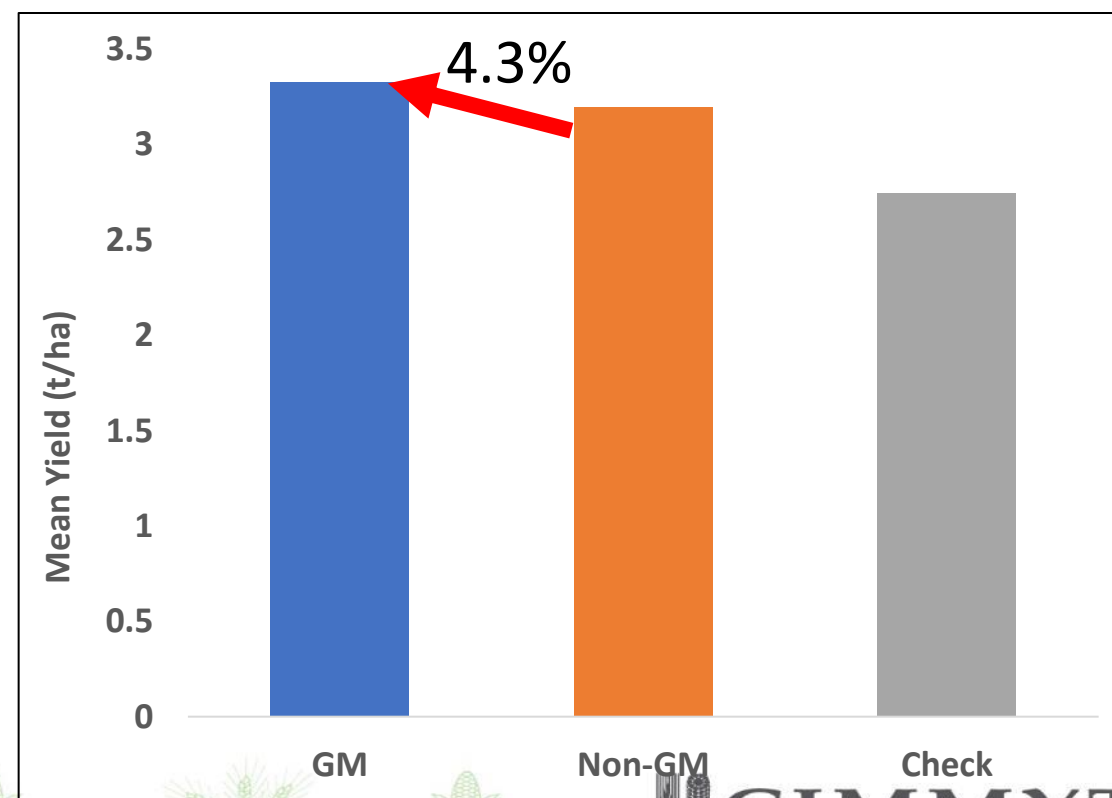
- Stem borer artificial infestation and FAW natural infestation

Country

Nigeria in the 2020 and 2021 dry season



Stem borer artificial infestation and FAW natural



Managed drought

TELA Maize NPTs in Kenya under stalk borer artificial infestation

KARLO Centre (NPT)	Planting date
Kiboko	12-08-2020 (DUS)
Kakamega	26-08-2020
Alupe	27-08-2020
Kibos	28-08-2020
Embu	20-10-2020
Mwea	21-10-2020
Kandara	22-10-2020



Three hybrids (WE1259B, WE3205B and WE5206B) recommended for release by National Performance Trial (NPT) Committee

Hybrid	Mean	% Above Best Check
WE1259	6.18	
WE1259B	6.86	15.0
WE3205	6.34	
WE3205B	6.79	13.0
WE5206	6.33	
WE5206B	7.06	18.0
DH02	2.75	
PAN4M19	5.1	
DK777	5.99	
DK8091	4.34	
DUMA43	4.39	

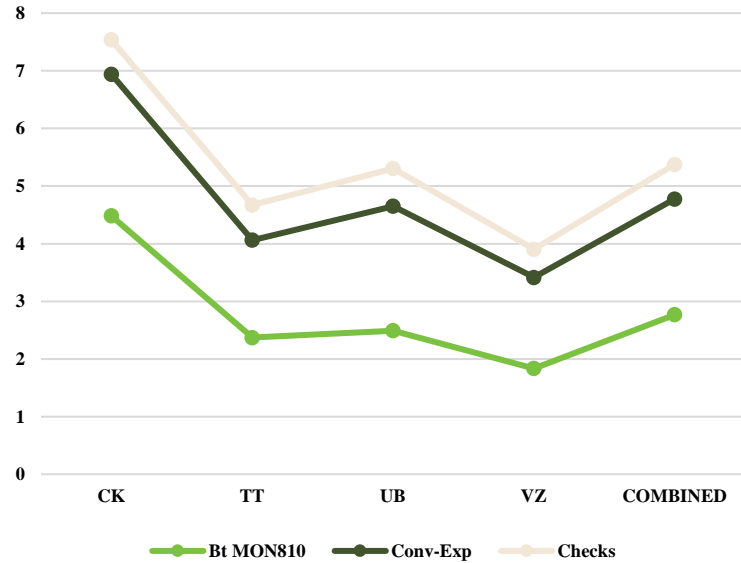


Results of MON89034 maize hybrids evaluated across 9 locations in Nigeria during 2022 crop season.

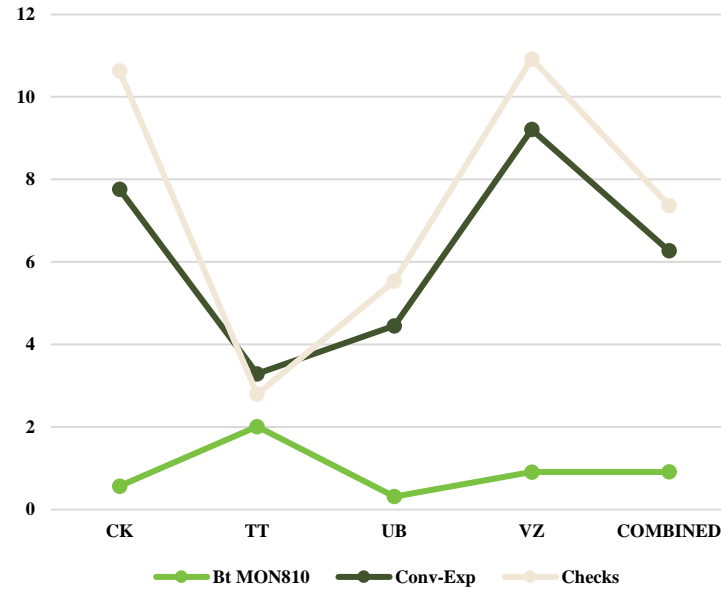
Entry	Hybrid	Grain yield, kg/ha	Days to silking	ASI	Plant height, cm	Husk cover	Plant aspect	Ear aspect	EPP
7	WE2279BII	6284	58	1.9	177	1.9	4.3	4.2	1.0
10	WE2259BII	6126	58	2.6	179	2.4	4.3	4.6	1.0
1	WE2272BII	6109	56	2.4	160	2.1	4.6	4.5	1.1
6	WE2243BII	5972	60	2.5	174	2.2	4.5	4.2	1.1
13	WE8206	5969	58	2.5	166	2.5	4.9	4.2	1.1
4	WE2261BII	5870	60	2.7	161	2.1	4.7	4.4	1.2
3	WE2276BII	5855	58	2.3	152	2.0	5.1	4.7	1.2
12	WE2250BII	5839	59	2.2	164	2.4	5.2	4.7	1.1
2	WE2251BII	5783	58	2.4	167	2.3	4.7	4.6	1.1
11	WE8206BII	5739	59	2.5	178	2.2	4.3	4.6	1.1
5	WE2256BII	5727	58	2.7	170	2.6	5.0	4.7	1.0
8	WE2246BII	5536	59	2.1	169	3.1	5.1	4.9	1.1
9	WE2295BII	5038	60	2.3	159	2.3	4.7	4.8	1.0
14	Oba Super 13	4953	61	2.6	177	2.6	4.8	4.6	1.0
15	FAWTH-2	4730	59	2.6	169	2.1	5.2	4.4	1.1
	Mean	5702	59	2.4	168	2.3	4.8	4.5	1.1
	LSD	700	1.5	1.3	13.6	0.4	0.5	0.7	0.2
	CV	18	3.4	31.6	10.6	21.2	13.7	15.5	18.5
	Heritability	0.7	0.8	0.5	0.6	0.8	0.7	0.7	0.5

Results: Leaf Damage, Exit Holes and Tunnel Length for Unsprayed Trials In Mozambique - Bt vs non-Bt and Checks

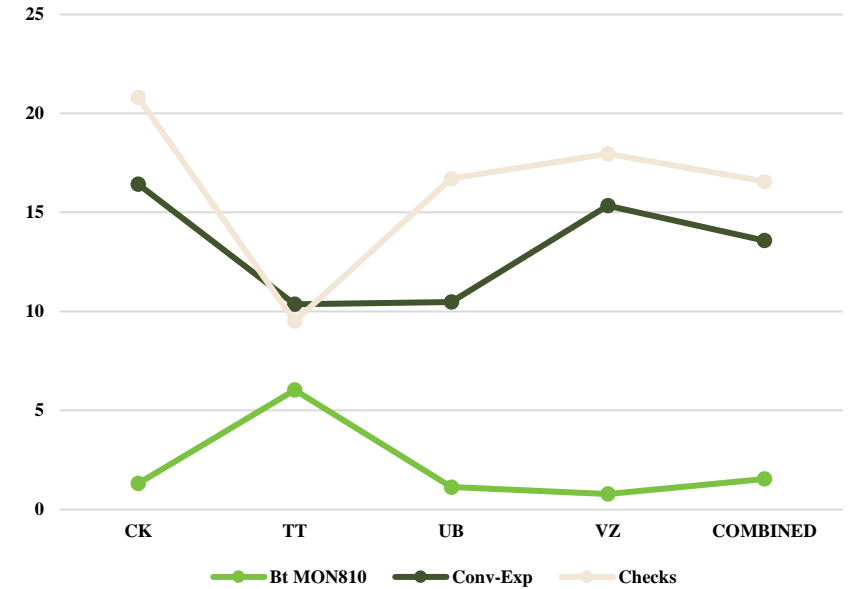
Leaf damage (1 - 9)



Exit holes



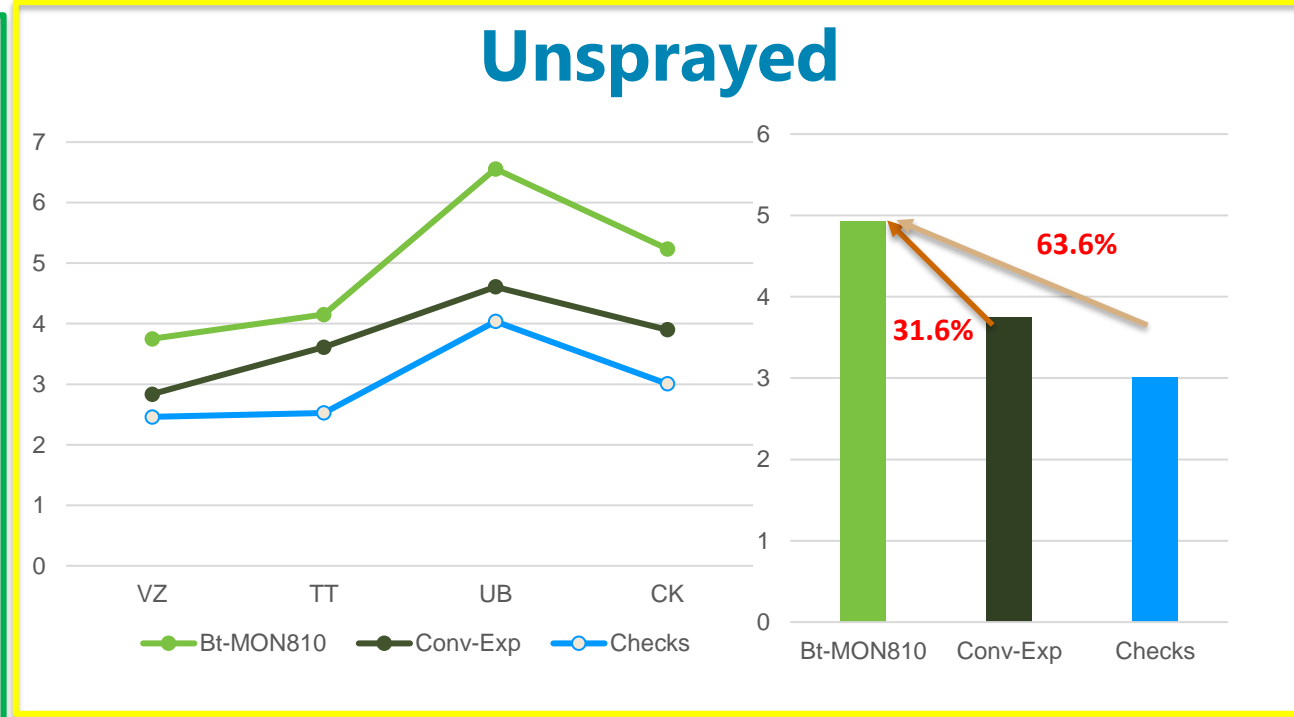
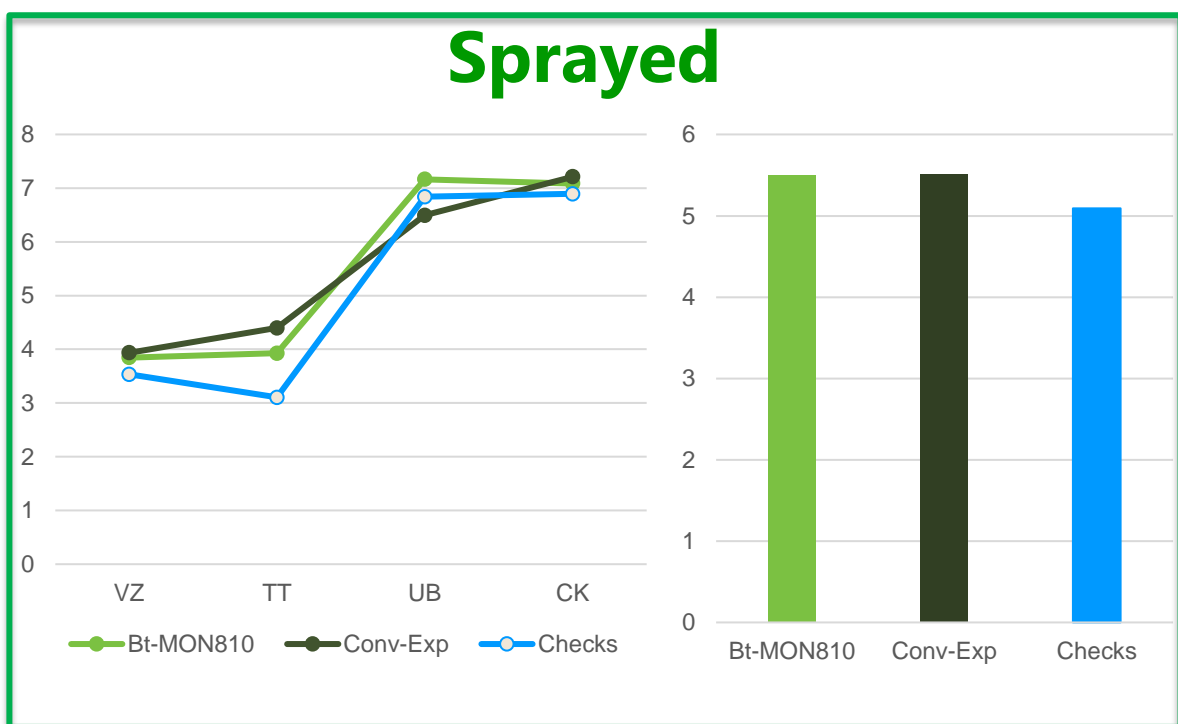
Tunnel Length (cm)



Entry	Genotype	Entry	Genotype
1	WE1101B	Pris061 not found	
2	WE3205B	3	WE3205
4	WE5206B	5	WE5206
6	WE7210B	7	WE7210
8	WE7202B	9	WE7202
10	PAN53	Commercial check1	
11	NAMULI	Commercial check2	
12	SP1	Commercial check3	

- 4 sites under irrigation,
- 2 experiment /site (sprayed and non-sprayed;
- 4 replications/experiments;
- 2 x 5 meters, 80 cm by 25 cm ` 50,000 plants /ha

Results: Grain Yield (t ha⁻¹) Sprayed and Unsprayed Trials Across 4 sites in Mozambique – Bt vs Conventional and Checks



Summary of Trait Integration Pipeline (as of 2022)

TRAIT	BAYER	CIMMYT	ARC	TOTAL
MON810	55	25	-	76
MON87460	23	28	3	53
MON810 + MON87460	24	16	-	40*
MON89034	27	2	2	31
MON89034 + NK603	2	-		2
TOTAL	128	69	5	207

CFT Uganda (Mon810 vs No Bt maize)



Bt Maize

Non-Bt Maize

Criteria for TI

- Pedigree
- Age of the line
- Special attributes (maturity, biotic, and abiotic resistance, nutritional quality)
- Adaptation (Lowland, mid-elevation, or highland)
- General combining ability (Moderate, high, and very high)
- Is the line parents of NPT /commercial hybrids?

Insect Resistance Management (IRM)

KENYA - MON 810

Key Achievements

1. IRM plan for MON810 TELA in Kenya
 - Refuge strategy – BiB (95:5)
 - Expert review conducted - Implement recommendations of the expert review
2. Stewardship Pamphlet (refuge statement) & statement for seed bag

NIGERIA - TELA MON89034

Key Achievements

1. An IRM plan for TELA MON89034 hybrids was developed and incorporated into the dossier submitted in Nigeria.
2. RiB (80:20) as IRM strategy
 - Regulatory engagement ongoing.
 - Logistics for implementation

RSA

- Farmer Compliance monitoring – conducted in February and March 2022
 - **99 smallholder farmers in Limpopo & Mpumalanga – 98% compliance**
 - 2 farmers not compliant - 1 refuge seeds mixed with traited seeds - 1 trained but did not implement the training.



Quality Assurance/ Quality Control (QA/QC)

▪ Trait Purity Testing.

Kenya

- BeCA (B4A) Lab for trait purity testing services
- SLA with BeCA has been signed
- Lab validation process – Ongoing

Nigeria

- 3rd party seed testing services for SME seed companies - NASC
Molecular lab identified – Option B needed - Africa Biosciences Lab/IITA Lab.
- SLA & Lab validation to commence.

▪ **Gap assessment audit/inspections of seed production facility** – commenced at IAR.

Guidance for ETS Membership for Licensees

- QBS – working to get ETS certification.
Working on QMS which is the basis for the certification.
 - Target is to get the ETS audit completed within the next 2 years.
- AATF/ETS Training for seed producers conducted on November 30, 2021
 - Proper framing of the benefits of ETS membership to seed companies – e.g., helps to save money by ensuring high quality from get go, rather than a stamp of approval. Etc.
 - Guidance on the process of ETS certification

Summary of Approvals for Deregulation

Country	Activity
Nigeria	<ul style="list-style-type: none">On-farm trials with MON89034 to be planted in 2023
Mozambique	<ul style="list-style-type: none">VCU trials undertaken with Stack (MON87460 and MON810) for for variety release
Ethiopia	<ul style="list-style-type: none">1st-year variety verification trials planted across location Stack (MON87460 and MON810) for variety releaseCFT for MON89034 x DT Stack to be planted in Sept 2023
Kenya	<ul style="list-style-type: none">3 MON810 hybrids passed NPT waiting for court injection



Challenges

- Slow review of application dossier for environmental release in Mozambique that took over a year, far beyond the provision in the regulations
- Prolonged delays in seed shipments into Ethiopia, Mozambique, and Nigeria from South Africa
- Still awaiting approval for commercialization of 3 TELA Bt hybrids in Kenya
- Anti-technology advocacy is on the rise, with a series of court cases filed in Kenya





**Thank you for
your interest!**