

CIMMYT Latin America Stage 4 and Stage 5 Trials

Results of the 2019 and 2020 Trials and Product Announcement

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Introduction

The CIMMYT Global Maize Program has developed a new and improved maize hybrid, now available for uptake by public and private sector partners, especially those interested in marketing or disseminating hybrid maize seed across mid-altitudes of Mexico and similar agro-ecological zones. National Agricultural Research Systems (NARS) and seed companies are hereby invited to apply for a license to pursue national release, scale-up seed production, and deliver this maize hybrid to farming communities. Product performance and other relevant information for this promising new hybrid are provided in the appendices below. A more comprehensive listing of CIMMYT maize products available for licensing can be found at the [CIMMYT Maize Product Catalog](#).

Each year, CIMMYT's Global Maize Program conducts Stage 4 and Stage 5 trials through a network of partners, including NARS and private seed companies, in Mexico under various management and environmental conditions (trial site information is attached as [Appendix 2](#)). Elite hybrids developed by the CIMMYT-Latin America team through a rigorous stage-gate advancement process, along with relevant benchmark commercial checks and CIMMYT internal genetic gain checks, are evaluated in these trials.

The objectives of these trials are:

1. To identify improved maize hybrids with higher yield, stress resilience, and agronomic performance, based on the must-have and nice-to-have traits included in specific product profiles;
2. To generate data to support varietal nomination under National Performance Trials (NPTs), and variety registration/release of new improved CIMMYT hybrids by the regulatory authorities in target countries;

3. To help partners replace outdated, less productive, less resilient and/or less profitable commercial varieties in the target market segment with improved genetics; and
4. To monitor breeding progress and enhance genetic gains in maize breeding.

In order to be considered during the first round of product allocations and licensing, interested institutions are requested to submit an application by **15 August 2022** through the [CIMMYT Maize Licensing Portal](#)¹. Any applications received after the deadline will be considered during subsequent rounds.

2020 Available CIMMYT Hybrid for Licensing to Partners

The newly available CIMMYT maize hybrid, [CIM20LAPP2B-2](#), was identified through rigorous trialing and a stage-gate advancement process that culminated in the 2020 Stage 5 trials for CIMMYT's Latin American tropical mid-altitude maize breeding pipeline (LA-PP2B). While individual products will vary, the LA-PP2B pipeline aims to develop maize hybrids fitting the product profile described in the following table:

Product Profile	<i>Basic traits</i>	<i>Nice-to-have / Emerging traits</i>
Latin America Product Profile 2B (LA-PP2B)	Intermediate-maturing, yellow, high-yielding, drought tolerant, resistant to FSR, GLS, and ear rots	TSC, TLB

The data on grain yield and other relevant traits of entries across contrasting environments in Mexico, and the performance of the selected CIMMYT maize hybrid available for licensing to the partners, is presented in [Appendix 1](#).

Upon receipt of a duly completed license application for registration and/or commercialization, the CIMMYT Maize Product Allocation Committee will review the applications received by the due date and will take decisions on allocation of specific products based on clear criteria designed to promote equitable support to our valued partners². Any applications received after the deadline will still be accepted for review, but will only be considered during subsequent rounds of product allocation.

Once CIMMYT finalizes its allocation decisions, applicants considered during the first round of allocations will be notified as to the success or otherwise of their applications by 30 August 2022. CIMMYT will maintain absolute confidentiality of commercially sensitive information for all the allocation decisions and related data (e.g., pedigree of an allocated hybrid, data submitted as part of the annual license reporting requirements, etc.). Successful applicants will be expected to

¹ <https://cimmyt.inteum.com/cimmyt/agreementportal/login.aspx>

² "Acquisition And Use of CIMMYT Maize Hybrids and OPVs for Commercialization" available at: <https://www.cimmyt.org/content/uploads/2021/08/Acquisition-and-use-of-CIMMYT-maize-hybrids-and-OPVs-for-commercialization-v2021-08-19.pdf>

demonstrate to CIMMYT that they are making progress along the path towards successful commercialization within reasonable timeframes and are expected to sign an agreement to that effect.

Further information regarding the product allocation process is available in the document, [ACQUISITION AND USE OF CIMMYT MAIZE HYBRIDS AND OPVs FOR COMMERCIALIZATION](#). For any further clarifications in this regard, please do not hesitate to contact any of the following contact persons in CIMMYT:

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Latin America Product Profile 2B

Mean yield performance and agronomic attributes of the candidate intermediate-maturing yellow hybrid CIM20LAPP2B-2 relative to commercial and internal genetic checks in Stage 4 trials conducted in 2019 and Stage 5 trials conducted in 2020 in the central mid-altitude environments of Mexico.

Target agro-ecologies: Central Mid-altitudes of Mexico and similar tropical environments, rainfed, irrigated

Hybrid	Comment	Grain Yield						Relative grain yield	Grain Moisture	Days to 50% anthesis	Anthesis-silking Interval (ASI) of the Hybrid	Difference in			
		Stage 5 Evaluation	Stage 4 Data			Grain yield of Single Cross	Grain yield of Pollen parent					flowering between Male & Female Parents	Plant height	Ear height	Ears per Plant
			Opt.	Rainfed	MD										
		t/ha	t/ha			t/ha		%	%	d	d	d	cm	cm	#
CIM20LAPP2B-2	Available	8.7	10.3	7.7	2.9	5.2	2.4	103	14.0	71	0.9	0	237	118	1.02
Internal Genetic Gain check 1		8.5	10.3	7.6	2.7			101	14.2	71	0.6		236	115	1.01
Internal Genetic Gain check 2		8.3	9.4	6.4	2.0			99	13.9	70	0.7		234	114	0.95
Commercial Check 1 / Stage 5 Check		8.4	10.2	7.7				100	14.1	70	0.8		231	110	0.96
Mean		8.0	8.9	6.1	1.8				14.1	70.1	0.7		232.3	114.5	1.0
LSD (0.05)		0.4	0.5	0.6	0.3				0.4	0.5	0.4		5.7	4.9	0.1
H		0.8	0.6	0.8	0.4				0.6	1.0	0.0		0.8	0.9	0.6
CV		13.9	11.5	12.0	21.5				7.6	1.7	136.3		5.7	9.9	12.2
nreps		2	2	2	2				2	2	2		2	2	2
nLoc		26	6	5	1				22	22	18		21	21	20

Product profile # LatAM-PP2B

Basic traits for target product profile Intermediate maturing, yellow, high yielding, drought tolerant, and resistant to fusarium stalk rots (data not available), Grey Leaf Spot (GLS), and Ear rots

Nice to have / emerging traits TLB, TSC

Notes: Opt = Optimum Management; MD = Managed drought

Relative grain yield: % grain yield of an entry against the best commercial check grain yield

Diseases scored on 1-9 scale: 1 = Highly resistant; 5 = Tolerant; 9 = Highly susceptible

Ear position values are ratios of ear height to plant height, small values indicate low ear position; large values indicate high ear position.

Stalk and root lodging expressed as percent of number of plants lodged to total number of plants in a plot

Bad husk cover expressed as percent of plants with bad husk cover lodged to total number of plants in a plot

Latin America Product Profile 2B

Mean yield performance and agronomic attributes of the candidate intermediate-maturing yellow hybrid CIM20LAPP2B-2 relative to commercial and internal genetic checks in Stage 4 trials conducted in 2019 and Stage 5 trials conducted in 2020 in the central mid-altitude environments of Mexico.

Target agro-ecologies: Central Mid-altitudes of Mexico and similar tropical environments, rainfed, irrigated

Hybrid	Ear Position	Bad Husk Cover	Lodging		GLS	P. Poly (Rust)	Turcicum Leaf Blight (TLB)	Ear Rots (ER)
	Ratio	%	Root %	Stalk %	1-9	1-9	1-9	%
CIM20LAPP2B-2	0.50	1.02	2.7	3.0	5.0	3.9	3.2	2.9
Internal Genetic Gain check 1	0.49	4.60	3.9	6.1	3.0	3.3	3.1	3.7
Internal Genetic Gain check 2	0.49	7.33	3.6	4.0	3.5	3.7	3.6	3.6
Commercial Check 1 / Stage 5 Check	0.48	8.32	1.1	4.6	5.0	3.9	3.3	4.5
Mean	0.50	5.9	3.7	6.8	5.5	3.8	3.2	4.2
LSD (0.05)	0.02	2.1	2.4	4.3	2.2	0.9	0.6	1.5
H	0.9	0.6	0.2	0.6	0.7	0.0	0.3	0.8
CV	8.8	78.5	147.9	144.0	19.5	19.3	22.3	86.6
nreps	2	2	2	2	2	2	2	2
nLoc	21	16	19	19	1	3	5	21

Product profile # LatAM-PP2B

Basic traits for target product profile

Intermediate maturing, yellow, high yielding, drought tolerant, and resistant to fusarium stalk rots (data not available), Grey Leaf Spot (GLS), and Ear rots

Nice to have / emerging traits

TLB, TSC

Notes: Opt = Optimum Management; MD = Managed drought

Relative grain yield: % grain yield of an entry against the best commercial check grain yield

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Ear position values are ratios of ear height to plant height, small values indicate low ear position; large values indicate high ear position.

Stalk and root lodging expressed as percent of number of plants lodged to total number of plants in a plot

Bad husk cover expressed as percent of plants with bad husk cover lodged to total number of plants in a plot

Appendix 2: Information on Mexico trial locations and management for the 2019 Stage 4 and 2020 Stage 5 Trials

Site No.	Name Of Experiment	Name Of Location	Country	Management	Testing Stage	Latitude	Longitude	Altitude (masl)
1	02-20MASTCHSTY-1	Tlaltizapán, Morelos	Mexico	Optimal	5	18.68	-99.13	928
2	02-20MASTCHSTY-2	Nextipac, Zapopan, Jalisco	Mexico	Rainfed	5	20.78	-103.52	1611
3	02-20MASTCHSTY-3	Charco de Pantoja, Valle de Santiago, Guanajuato	Mexico	Optimal	5	20.39	-101.38	1700
4	02-20MASTCHSTY-4	Celaya, Guanajuato	Mexico	Optimal	5	20.57	-100.82	1761
5	02-20MASTCHSTY-5	Villagrán, Guanajuato	Mexico	Optimal	5	20.56	-101.07	1728
6	02-20MASTCHSTY-6	La Magdalena, Venustiano Carranza, Michoacán	Mexico	Rainfed	5	20.20	-102.67	1525
7	02-20MASTCHSTY-7	Las Agujas, Zapopan, Jalisco	Mexico	Rainfed	5	20.74	-103.51	1658
8	02-20MASTCHSTY-13	Celaya, Guanajuato	Mexico	Optimal	5	20.58	-100.82	1761
9	02-20MASTCHSTY-15	Piedras Negras, Veracruz	Mexico	Rainfed	5	18.77	-97.21	1345
10	02-20MASTCHSTY-16	Cuamio, Cuitzeo, Michoacán	Mexico	Optimal	5	20.01	-101.16	1838
11	02-20MASTCHSTY-17	Tonila, Jalisco	Mexico	Rainfed	5	19.42	-103.54	1237
12	02-20MASTCHSTY-18	Tierras Coloradas, Acatic, Jalisco	Mexico	Rainfed	5	20.74	-102.86	1771
13	02-20MASTCHSTY-19	Cofradia, Tlajomulco de Zúñiga, Jalisco	Mexico	Rainfed	5	20.48	-103.56	1513
14	02-20MASTCHSTY-20	Cointzio, Morelia, Michoacán	Mexico	Optimal	5	19.67	-101.25	1887
15	02-20MASTCHSTY-21	Ixtlahuacán, Jalisco	Mexico	Rainfed	5	20.41	-103.14	1510
16	02-20MASTCHSTY-22	Tepalcingo, Morelos	Mexico	Optimal	5	18.60	-98.82	1164
17	02-20MASTCHSTY-23	San Juan Evangelista, Tlajomulco de Zúñiga, Jalisco	Mexico	Rainfed	5	20.40	-103.32	1557
18	02-20MASTCHSTY-24	Santa Cruz el Grande, Poncitlán, Jalisco	Mexico	Rainfed	5	20.38	-102.88	1529
19	02-20MASTCHSTY-25	Vista Hermosa, Michoacán	Mexico	Optimal	5	20.25	-102.48	1544
20	02-20MASTCHSTY-26	Cocula, Jalisco	Mexico	Rainfed	5	20.40	-103.82	1288
21	02-20MASTCHSTY-28	Reyes Mantecón, San Bartolo, Oaxaca	Mexico	Rainfed	5	16.91	-96.73	1505
22	02-20MASTCHSTY-30	San José de Bazarte, Tepatitlán de Morelos, Jalisco	Mexico	Rainfed	5	20.85	-102.75	1908
23	02-20MASTCHSTY-31	La Villa, Tepatitlán de Morelos, Jalisco	Mexico	Rainfed	5	20.86	-102.75	1933
24	02-20MASTCHSTY-32	Ojo de Agua de Hernández, Tepatitlán de Morelos, Jalisco	Mexico	Rainfed	5	20.69	-102.86	1760
25	02-20MASTCHSTY-33	Villagrán, Guanajuato	Mexico	Optimal	5	20.52	-100.98	1737
26	02-20MASTCHSTY-35	La Loma, Tepatitlán de Morelos, Jalisco	Mexico	Rainfed	5	20.76	-102.75	1813
27	19STC3YA-1	Tlaltizapán, Morelos	Mexico	Optimal	4	18.68	-99.13	926
28	19STC3YA-4	Nextipac, Zapopan, Jalisco	Mexico	Rainfed	4	20.79	-103.52	1611
29	19STC3YA-6	Charco de Pantoja, Valle de Santiago, Guanajuato	Mexico	Optimal	4	20.39	-101.38	1700
30	19STC3YA-13	Tepalcingo, Morelos	Mexico	Rainfed	4	18.60	-98.82	1165
31	19STC3YA-14	Reyes Mantecón, San Bartolo, Oaxaca	Mexico	Rainfed	4	16.91	-96.73	1502
32	19STC3YA-5	La Villa, Tepatitlán de Morelos, Jalisco	Mexico	Rainfed	4	20.86	-102.75	1933
33	19STC3YA-3	Villagrán, Guanajuato	Mexico	Optimal	4	20.52	-100.98	1735
34	19STC3YA-9	Cuitzeo, Michoacán	Mexico	Optimal	4	20.01	-101.16	1839
35	19STC3YA-8	Capilla de Milpillás, Tepatitlán de Morelos, Jalisco	Mexico	Rainfed	4	20.66	-102.83	1859
36	19STC3YA-10	Celaya, Guanajuato	Mexico	Optimal	4	20.57	-100.82	1762
37	19STC3YA-2	Guanajuato, Guanajuato	Mexico	Optimal	4	20.55	-101.08	1723
28	19STC3YA-20	Tlaltizapán, Morelos	Mexico	Managed drought	4	18.68	-99.13	926