

CIMMYT-Eastern Africa Regional Office (CIMMYT-EARO)

Maize Regional Trials: Results of the 2017 Season

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Introduction

New and improved maize hybrids, developed by the CIMMYT Global Maize Program, are available for uptake by public and private sector partners, especially those interested in marketing or disseminating hybrid maize seed across southern Africa and similar agro-ecological zones. NARS and seed companies are hereby invited to apply for permission for allocation of these pre-commercial maize hybrids for potential registration, seed scale-up and delivery to the farming communities, based on the performance data generated through Regional Trials conducted by CIMMYT eastern Africa Regional Office (CIMMYT-EARO). Product performance and other relevant information for the promising hybrids available for allocation are attached.

Each year, CIMMYT Global Maize Program conducts regional hybrid maize trials through a network of NARS and private seed companies in eastern and southern Africa under various management and environmental conditions (site summary attached). Pre-commercial maize hybrids developed by the CIMMYT-Africa team, along with relevant checks from private seed companies and National Agricultural Research Programs are included in these trials.

The **objectives of these regional trials** are:

1. To provide data to support variety registration and release of new improved pre-commercial hybrids from CIMMYT on a regional as well as country basis;
2. To provide data to guide maize varietal release, use and dissemination in target geographies;
4. To identify improved maize hybrids that can potentially replace old and outdated commercial varieties in the market;
4. To provide a common platform for the partners to assess/evaluate their products from breeding programs;

5. To monitor the breeding progress and enhance regional genetic gains in maize breeding and product development; and
6. To enrich and widen the genetic base of improved maize germplasm through germplasm exchange.

Interested institutions are requested to submit a letter of interest along with duly-filled application form (template attached) by **10th February 2018** by email to **Dr B.M. Prasanna**, Director, Global Maize Program, CIMMYT (b.m.prasanna@cgiar.org), with copy to **Nick Davis**, Program Manager, Global Maize Program, CIMMYT (n.davis@cgiar.org).

Details of Regional Trials conducted by CIMMYT in East Africa in 2017

1. **EHYB17-Set I** – Early/extra-early maturing elite pre-commercial hybrids regional trials (including external and internal checks)
2. **IHYB17-Set I** – Intermediate maturing elite pre-commercial hybrids regional trial (including external and internal checks)
3. **ILHYB17** – Intermediate-Late maturing elite pre-released and released hybrids regional trials (including external and internal checks)
4. **EHYB17-Set II** – Early maturing elite pre-commercial hybrids regional trials
5. **ILHYB17 Set II** – Intermediate/late maturing elite pre-commercial hybrids regional trials

2018 CIMMYT-EARO Available Hybrids for Licensing to Partners

In 2017, approximately 95% of entries under Regional Trials are contributed by CIMMYT-Africa. The data on grain yield and other relevant traits of entries across contrasting environments in East Africa is analyzed, and the performance of selected CIMMYT pre-commercial maize hybrids available for licensing to the partners is presented in **Tables 1-5**.

Interested NARS and Seed Companies are hereby invited to apply for permission to register and commercialize selected maize hybrids from the available list of pre-commercial hybrids. Kindly submit a letter of interest/application along with duly-filled application form (template attached) to **Dr B.M. Prasanna**, Director, Global Maize Program, CIMMYT (b.m.prasanna@cgiar.org) with copy to **Nick Davis**, Program Manager, Global Maize Program, CIMMYT (n.davis@cgiar.org) by **10th February 2018**. 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 partners (see **Appendix 1**).

Once CIMMYT finalizes its allocation decisions, applicants will be notified as to the success or otherwise of their applications by **15th February 2018**. CIMMYT will maintain absolute confidentiality of commercially sensitive information (e.g., pedigree of an allocated hybrid) for all the allocation decisions and related data. Successful applicants will be expected to demonstrate to CIMMYT the path of their commercialization efforts within reasonable timeframe, and are expected to sign an agreement to that effect.

Further information regarding the product allocation process is given in **Appendix 1** below. 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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APPENDIX 1: ACQUISITION AND USE OF CIMMYT MAIZE HYBRIDS FOR COMMERCIALIZATION

The principle purpose of CIMMYT's Germplasm development work is to provide improved, adapted and stress-tolerant varieties with particular benefit to resource-poor farmers. CIMMYT has produced both open-pollinated varieties (OPVs) and hybrids of maize suited to various agro-ecological zones. Furthermore, there are varieties with specific traits, such as Quality Protein Maize and Pro-vitamin A maize. Institutions (both public and private) may apply for permission to register CIMMYT varieties in specified countries within the framework of the applicable laws, rules and regulations of those countries, harmonized regional seed laws, and the Standard Material Transfer Agreement (SMTA) of CIMMYT. In granting permission to an institute to register CIMMYT-derived pre-commercial hybrids as varieties, CIMMYT retains all legal rights which it currently has in such varieties, including parental lines, and since CIMMYT Germplasm is an International Public Good, the Partner Institution may not acquire any ownership interest in the varieties or parental lines. In many instances, seed of CIMMYT varieties, and their parents, is already in the possession of parties other than the Institution to which permission is granted, and therefore such varieties may continue to be used for testing and research purposes, or commercialization in other countries.

The approach used by CIMMYT in granting permission to Institutions to register CIMMYT maize varieties differs depending on whether the variety is an OPV or hybrid. Here, the process for hybrids is described. By nature, hybrids are uniquely defined by their parental combination, while they are more difficult to produce than OPVs and the grain from hybrids should not be planted as seed. Consequently, permission to register hybrids is granted to particular Institutions on a confidential basis. The Institution becomes the maintainer of the hybrid variety, and may give the hybrid a unique name. The Institution is therefore not obliged to publicly reveal the source of the variety nor provide parental seed to other interested parties.

Allocation Process for CIMMYT's Elite Pre-commercial Hybrids to Interested Institutions

Institutions that are interested in registering CIMMYT elite products (pre-commercial maize hybrids or OPVs) may contact CIMMYT Global Maize Program Director (b.m.prasanna@cgiar.org) or Global Maize Program Manager (n.davis@cgiar.org) and request for permission to register varieties of their choice, based on the web announcement. If more than one partner is interested in registering a particular product in a given geography, CIMMYT reserves the right to allocate the variety to only one partner based on an evaluation of the following criteria:

1. Investment by the applicant in variety testing and seed production.
2. Likelihood that seed will become widely available to smallholder farmers.
3. Likelihood that seed will become widely available as soon as possible.
4. Diversity among suppliers of improved seed.
5. Diversity of regions where the variety will be marketed.
6. Track record of the applicant as a CIMMYT collaborator.
7. Relative importance of a variety for the variety portfolio or success of an applicant.

Once a particular product has been allocated to an applicant based on the letter of interest and filled in product allocation request form, the successful applicant will receive a product allocation certificate and an agreement for signing. Once the process is completed, the applicant will be responsible for further testing, registration and commercialization of the allocated product in the target geography for which the product is allocated by CIMMYT. CIMMYT will provide small quantities of breeders' seed of the hybrid (and its parents, where appropriate) to enable the Institution to begin testing and multiplication of the product.

2017 Trial Summary Information

	Trial Name	Site No	Entries	Reps	Rows / plot	Total Plots	Total Rows	Site	Country	Management	Collaborator	Comments	Data recovery
2017-Early Maturity Hybrid Trials-Set I													
1	EA-EHYB-2017A-RT	1	50	3	2	150	300	Kiboko	Kenya	Optimal	Jumbo		ok
2	EA-EHYB-2017A-RT	2	50	3	1	150	150	Kiboko CFT	Kenya	Drought	Jumbo	Planted on 1 row plot due to limited space	ok
3	EA-EHYB-2017A-RT	3	50	3	2	150	300	Kiboko	Kenya	Low N	Jumbo		ok
4	EA-EHYB-2017A-RT	4	50	3	2	150	300	Kiboko	Kenya	High Density	Jumbo		ok
5	EA-EHYB-2017A-RT	7	50	3	2	150	300	Embu	Kenya	Optimal	Mutinda		ok
6	EA-EHYB-2017A-RT	8	50	3	2	150	300	Embu	Kenya	Low N	Jumbo/Mutinda		ok
7	EA-EHYB-2017A-RT	9	50	3	2	150	300	Embu	Kenya	High Density	Jumbo/Mutinda		ok
8	EA-EHYB-2017A-RT	10	50	3	2	150	300	KYU	Kenya	Optimal	Jumbo/Mutinda		ok
9	EA-EHYB-2017A-RT	11	50	3	1	150	150	Kakamega KALRO	Kenya	Optimal	Jumbo/Vincent	Planted on 1 row plot due to limited space	ok
10	EA-EHYB-2017A-RT	12	50	3	2	150	300	Kakamega KALRO	Kenya	Low N	Jumbo/Vincent		ok
11	EA-EHYB-2017A-RT	14	50	3	2	150	300	Kitale KALRO	Kenya	Stem borer	Bruce		ok
12	EA-EHYB-2017A-RT	16	50	3	2	150	300	Kibos	Kenya	Optimal	Jumbo		ok
13	EA-EHYB-2017A-RT	17	50	3	2	150	300	Kitale KALRO	Kenya	Optimal	Jumbo/Dickson		ok
14	EA-EHYB-2017A-RT	18	50	3	2	150	300	Kitale KALRO	Kenya	Low N	Jumbo/Dickson		ok
15	EA-EHYB-2017A-RT	20	50	3	2	150	300	Naivasha	Kenya	MLN AI	Suresh		ok
16	EA-EHYB-2017A-RT	21	50	3	1	150	150	Alupe	Kenya	Striga	Dan	Planted on 1 row plot due to limited space	ok
17	EA-EHYB-2017A-RT	23	50	3	2	150	300	Babati-Khrishna Farm	Tanzania	MLN Natural	Kheri Kitenge		ok
18	EA-EHYB-2017A-RT	24	50	3	2	150	300	Babati-Kiru Six	Tanzania	MLN Natural	Kheri Kitenge		ok
19	EA-EHYB-2017A-RT	25	50	3	2	150	300	Babati-Matufa	Tanzania	MLN Natural	Kheri Kitenge		ok
20	EA-EHYB-2017A-RT	26	50	3	2	150	300	Babati-Suba Agro Farm	Tanzania	MLN Natural	Kheri Kitenge		ok
23	EA-EHYB-2017A-RT	29	50	3	2	150	300	Serere	Uganda	Optimal	Godfrey Asea		ok
24	EA-EHYB-2017A-RT	30	50	3	2	150	300	Ngetta	Uganda	Optimal	Godfrey Asea		ok
25	EA-EHYB-2017A-RT	31	50	3	2	150	300	Bulindi	Uganda	Optimal	Godfrey Asea		ok
26	EA-EHYB-2017A-RT	34	50	3	2	150	300	Kenya Seed Farm	Kenya	Optimal	Kenya Seed Co		ok
27	EA-EHYB-2017A-RT	35	50	3	2	150	300	Elgon downs farm	Kenya	Optimal	Western Seed		ok
28	EA-EHYB-2017A-RT	37	50	3	2	150	300	Kitale	Kenya	Optimal	Western Seed		ok
29	EA-EHYB-2017A-RT	38	50	3	2	150	300	Mtwapa KALRO	Kenya	Optimal	Lewis		ok
Total							7650						

2017 Trial Summary Information

2017-Intermediate maturity hybrid Trials-Set I													
1	EA-IHYB-2017A-RT	1	75	2	2	150	300	Kiboko	Kenya	Optimal	Jumbo		ok
2	EA-IHYB-2017A-RT	2	75	2	1	150	150	Kiboko CFT	Kenya	Drought	Jumbo	Planted on 1 row plot due to limited space	ok
3	EA-IHYB-2017A-RT	3	75	2	2	150	300	Kiboko	Kenya	Low N	Jumbo		ok
4	EA-IHYB-2017A-RT	4	75	2	2	150	300	Kiboko	Kenya	High Density	Jumbo		ok
5	EA-IHYB-2017A-RT	7	75	2	2	150	300	Embu	Kenya	Optimal	Mutinda		ok
6	EA-IHYB-2017A-RT	8	75	2	2	150	300	Embu	Kenya	Low N	Jumbo/Mutinda		ok
7	EA-IHYB-2017A-RT	9	75	2	1	150	150	Embu	Kenya	High Density	Jumbo/Mutinda	Planted on 1 row plot due to limited space	ok
8	EA-IHYB-2017A-RT	10	75	2	2	150	300	KYU	Kenya	Optimal	Jumbo/Mutinda		ok
9	EA-IHYB-2017A-RT	11	75	2	2	150	300	Kakamega KALRO	Kenya	Optimal	Jumbo/Vincent		ok
10	EA-IHYB-2017A-RT	12	75	2	2	150	300	Kakamega KALRO	Kenya	Low N	Jumbo/Vincent		ok
11	EA-IHYB-2017A-RT	14	75	2	2	150	300	Sikusa	Kenya	Optimal	Western S. Co		ok
12	EA-IHYB-2017A-RT	16	75	2	2	150	300	Kibos	Kenya	Optimal	Jumbo		ok
13	EA-IHYB-2017A-RT	17	75	2	2	150	300	Kitale KALRO	Kenya	Optimal	Jumbo/Dickson		ok
14	EA-IHYB-2017A-RT	18	75	2	2	150	300	Kitale KALRO	Kenya	Low N	Jumbo/Dickson		ok
16	EA-IHYB-2017A-RT	20	75	2	2	150	300	Naivasha	Kenya	MLN AI	Suresh		ok
17	EA-IHYB-2017A-RT	21	75	2	2	150	300	Alupe	Kenya	Striga	Dan		ok
18	EA-IHYB-2017A-RT	23	75	2	2	150	300	Babati-Khrishna Farm	Tanzania	MLN Natural	Kheri Kitenge		ok
19	EA-IHYB-2017A-RT	24	75	2	2	150	300	Babati-Kiru Six	Tanzania	MLN Natural	Kheri Kitenge		ok
20	EA-IHYB-2017A-RT	25	75	2	2	150	300	Babati-Matufa	Tanzania	MLN Natural	Kheri Kitenge		ok
21	EA-IHYB-2017A-RT	26	75	2	2	150	126	Babati-Suba Agro Farm	Tanzania	MLN Natural	Kheri Kitenge		ok
24	EA-IHYB-2017A-RT	29	75	2	2	150	300	Serere	Uganda	Optimal	Godfrey Asea		ok
25	EA-IHYB-2017A-RT	30	75	2	2	150	300	Ngetta	Uganda	Optimal	Godfrey Asea		ok
26	EA-IHYB-2017A-RT	31	75	2	2	150	300	Bulindi	Uganda	Optimal	Godfrey Asea		ok
27	EA-IHYB-2017A-RT	34	75	2	2	150	300	Kenya Seed Farm	Kenya	Optimal	Kenya Seed Co		ok
28	EA-IHYB-2017A-RT	36	75	2	2	150	300	Thika	Kenya	Optimal	Easeed		ok
29	EA-IHYB-2017A-RT	37	75	2	2	150	300	Kitale KALRO	Kenya	High Density	Dickson/Jumbo		ok
Total							7326						

2017 Trial Summary Information

2017-Intermediate-Late Maturity hybrid trials													
1	EA-LHYB-2017A-RT	1	66	2	2	132	264	Kiboko	Kenya	Optimal	Jumbo		ok
2	EA-LHYB-2017A-RT	2	66	2	1	132	132	Kiboko CFT	Kenya	Drought	Jumbo		ok
3	EA-LHYB-2017A-RT	3	66	2	2	132	264	Kiboko	Kenya	Low N	Jumbo	Planted on 1 row due to limited space	ok
4	EA-LHYB-2017A-RT	4	66	2	2	132	264	Kiboko	Kenya	High Density	Jumbo		ok
5	EA-LHYB-2017A-RT	7	66	2	2	132	264	Embu	Kenya	Optimal	Mutinda		ok
6	EA-LHYB-2017A-RT	8	66	2	2	132	264	Embu	Kenya	Low N	Jumbo/Mutinda		ok
7	EA-LHYB-2017A-RT	9	66	2	1	132	132	Embu	Kenya	High Density	Jumbo/Mutinda	Planted on 1 row due to limited space	ok
8	EA-LHYB-2017A-RT	10	66	2	2	132	264	KYU	Kenya	Optimal	Jumbo/Mutinda		ok
9	EA-LHYB-2017A-RT	11	66	2	1	132	132	Kakamega KALRO	Kenya	Optimal	Jumbo/Vincent	Planted on 1 row due to limited space	ok
10	EA-LHYB-2017A-RT	12	66	2	2	132	264	Kakamega KALRO	Kenya	Low N	Jumbo/Vincent		ok
11	EA-LHYB-2017A-RT	14	66	2	2	132	264	Kitale KALRO	Kenya	Stem borer+ fa	Bruce		ok
12	EA-LHYB-2017A-RT	16	66	2	1	132	132	Kibos	Kenya	Optimal	Jumbo	Planted on 1 row due to limited space	ok
13	EA-LHYB-2017A-RT	17	66	2	2	132	264	Kitale KALRO	Kenya	Optimal	Jumbo/Dickson		ok
14	EA-LHYB-2017A-RT	18	66	2	2	132	264	Kitale KALRO	Kenya	Low N	Jumbo/Dickson		ok
15	EA-LHYB-2017A-RT	20	66	2	2	132	264	Naivasha	Kenya	MLN AI	Suresh		ok
16	EA-LHYB-2017A-RT	21	66	2	1	132	132	Alupe	Kenya	Striga	Dan	Planted on 1 row due to limited space	ok
17	EA-LHYB-2017A-RT	22	66	2	2	132	264	Babati-Krishna Farm	Tanzania	MLN Natural	Kheri Kitenge		ok
18	EA-LHYB-2017A-RT	23	66	2	2	132	264	Babati-Mara Estate	Tanzania	MLN Natural	Kheri Kitenge		ok
19	EA-LHYB-2017A-RT	24	66	2	2	132	264	Selian	Tanzania	Optimal	Kheri Kitenge		ok
20	EA-LHYB-2017A-RT	25	66	2	2	132	264	Moshi	Tanzania	Optimal	Kheri Kitenge		ok
23	EA-LHYB-2017A-RT	28	66	2	2	132	264	Serere	Uganda	Optimal	Godfrey Asea		ok
24	EA-LHYB-2017A-RT	29	66	2	2	132	264	Ngetta	Uganda	Optimal	Godfrey Asea		ok
25	EA-LHYB-2017A-RT	30	66	2	2	132	264	Bulindi	Uganda	Optimal	Godfrey Asea		ok
26	EA-LHYB-2017A-RT	34	66	2	2	132	264	Kenya Seed Farm	Kenya	Optimal	Kenya Seed Co		ok
27	EA-LHYB-2017A-RT	35	66	2	2	132	264	ADC Cholim	Kenya	Optimal	Kenya Seed Co		ok
28	EA-LHYB-2017A-RT	36	66	2	2	132	264	Thika	Kenya	Optimal	Easeed		ok
Total							6204						

Mean yield performance and agronomic attributes of available elite early maturing CIMMYT pre-commercial hybrids vis-à-vis commercial and internal genetic check hybrids in East Africa 2017 Regional Trial (EHYB17-Set I)

Entry	Hybrid	Comment	ME-A	ME_A	ME-C	ME-D	Relative grain yield	Grain Moisture	Days to 50% anthesis	Anthesis-silking Interval of the Hybrid	Difference in flowering between Male & Female Parents	Plant height	Ear height	Ear position	Bad Husk Cover	Ear Aspect	Plant Aspect	Lodging	MLN Score (under Artificial Inoculation at Naivasha)	Gray Leaf Spot	Common Rust	Leaf Blight	Maize Streak Virus	Ear Rots	LGB	MW	
			Opt	HD	MD	Low N																					Ratio
			t/ha				%	%	d	d	d	cm	cm	0-1	%	1-5	1-5	%	%	1-9	1-5	1-5	1-5	1-5	#	g	g
43	DHO4	Commercial Check	2.6	3.4	0.0	2.6	51.0	14.5	70	1.0		229	114	0.49	9.5	2.9	2.8	6.9	12.0	7.7	1.5	1.9	2.3	2.2	12.1	12.3	13.4
44	DK8031	Commercial Check	4.2	4.1	3.0	4.0	82.4	14.0	70	1.7		235	115	0.49	16.4	3.0	2.6	2.8	11.7	5.5	1.5	1.9	1.7	2.2	10.6	24.1	10.4
45	DUMA43	Commercial Check	4.3	4.5	0.5	3.3	84.3	14.5	75	3.0		212	97	0.47	22.6	3.4	2.7	4.4	9.7	5.8	1.4	1.8	2.0	2.2	10.6	11.6	3.9
46	P2849W	Commercial Check	2.9	3.2	0.0	2.6	56.9	14.2	67	1.0		221	110	0.45	15.6	3.0	2.6	4.4	12.2	5.5	1.4	2.1	1.9	2.1	13.3	18.1	16.9
47	SAWA-DSLH103	Commercial Check	5.4	3.7	2.0	3.8	105.9	15.0	71	1.0		216	108	0.48	11.8	2.9	2.7	3.9	15.5	4.5	1.6	1.8	2.1	2.2	12.5	13.4	7.6
48	MH401(TOSHEKA)	Commercial Check	4.5	3.6	1.0	3.8	88.2	15.2	71	1.7		213	102	0.49	15.9	2.5	2.5	2.4	9.4	5.0	1.4	1.7	1.9	2	8.6	22.4	22.5
49	EASH1456	Commercial Check	4.4	4.4	0.3	3.5	86.3	14.7	72	3.3		239	125	0.49	14.7	2.4	2.5	2.2	12.7	4.8	1.5	2.1	2.0	2.1	8.6	24.2	23.7
50	Local Check-1	Local Check	4.1	3.5	0.3	3.6	80.4	14.3	70	2.3		222	109	0.49	15.4	2.9	2.7	3.7	9.0	6.8	1.5	1.8	1.9	2.2	13.5	21.0	4.4
6	CKH150149	Available	6.4	4.7	0.8	5.1	103.9	15.1	72	1.0	-4	230	112	0.48	6.7	2.7	33	2.3	10.4	5.3	1.6	1.8	2.0	2.1	8.7	15.7	19.7
8	CKH150331	Available	6.3	5.9	0.6	4.8	113.7	14.9	71	0.4	-3	226	108	0.52	6.0	2.5	2.7	2.4	8.4	5.0	1.4	1.8	1.9	2.1	7.0	18.7	13.7
17	CKH150212	Available	6.4	5.4	2.1	4.1	102.0	15.3	74	1.0	-5	237	124	0.49	8.1	2.4	2.6	2.8	15.6	5.0	1.5	1.8	1.9	2.1	7.7	11.7	13.8
9	CKH150148	Available	6.4	4.6	0.3	5.2	98.0	14.9	71	1.1	0	241	118	0.48	10.5	2.8	2.6	3.5	10.4	4.5	1.7	1.7	1.7	2.2	10.5	13.1	8.0
25	CKDHH160032	Available	6.2	4.9	1.5	4.8	96.1	15.0	72	1.0	-3	227	113	0.48	7.9	2.3	2.5	2.3	10.2	5.2	1.5	1.9	2.1	2.2	7.5	22.9	4.3
	Mean		5.1	2.6	0.6	4.2	100	14.9	72	1.2		229	113	0.49	0.49	2.6	2.6	3.1	11.6	6.4	1.5	1.8	2	2.1	9.6	16.7	8.2
	LSD (0.05)		0.5	1.3	0.4	0.9		0.8	1.2	0.7		7	5	0.02	0.02	0.2	0.2	2.1	4.1	0.7	0.2	0.3	0.3	0.3	3.2	9.2	16.3
	H		0.9	0.6	0.8	0.7		0.5	0.9	0.8		0.85	0.88	0.8	0.8	0.8	0.5	0.5	0.7	0.7	0.2	0.6	0.7	0.1	0.6	0.5	0.2
	nLoc		9	1	1	2		4	8	8		8	9	9	7	9	4	8	8	1	3	5	4	3	8	1	1

Notes:

ME = Mega-environment; ME-A, -B, -C, -D = Mega-environment A, B, C, D

Opt = Optimum (53, 000 plants) ; HD = high density (80, 000 plants); RS = Random stress; N= Nitrogen; P= phosphorus; pH = soil pH (acidity); MD = Managed Drought

Relative grain yield: % grain yield of an entry against the overall trial mean grain yield

Diseases scored on 1-5 scale: 1 = Resistant; 3 = Tolerant, 5 = Highly susceptible

Maize Lethal Necrosis (MLN) score: = 1-9: 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.

SL = Stem lodging expressed as percent of number of plants lodged (stem) to total number of plants in a plot

RL = Root lodging at root expressed as percent of plants lodged to total number of plants in a plot

RL = Root lodging at root expressed as percent of plants lodged to total number of plants in a plot

LGB: Large Grain Borer; MW: Maize Weevil

Mean yield performance and agronomic attributes of available elite early maturing CIMMYT pre-commercial hybrids vis-à-vis commercial and internal genetic check hybrids in East Africa 2017 Regional Trial (EHYB17-Set II)

Entry	Hybrid	Comment	ME-A	ME-B	ME-C	Relative grain yield	Grain Moist.	Days to 50% Anthesis	Anthesis-silking Interval (ASI) of the hybrid	Difference in flowering of Male and Female Parents Nicking	Plant height	Ear Position	Bad Husk Cover	Grain Texture	Ear Aspect	Plant Aspect	Lodging	Gray Leaf Spot	Com-mon Rust	Leaf Blight	Ear Rots		
																						Opt	RS
			t/ha				%	%	d	d	d	cm	0-1	%	1-5	1-5	1-5	%	%	1-5	1-5	1-5	#
51	DH04	Commercial check	4.2	1.6	2.2	70.4	17.8	67.3	1.7		222.5	0.5	6.2	4.8	3.2	2.9	10.1	10.6	2.4	2.1	2.4	21.3	
52	Duma 43	Commercial check	4.9	2.4	2.3	81.2	15.8	63.2	1.9		228.5	0.4	13.9	4.0	3.1	2.8	13.1	10.5	1.9	2.1	1.9	19.6	
53	DK 8031	Commercial check	4.0	2.0	1.9	67.8	15.8	65.7	2.2		220.9	0.5	14.2	3.7	3.5	2.9	10.3	10.7	2.0	2.1	2.0	23.4	
54	PAN4M-19	Commercial check	5.0	2.3	2.1	84.2	15.5	65.2	1.8		211.1	0.5	13.1	5.7	3.0	2.9	29.8	9.0	2.7	1.7	2.7	21.3	
55	Local Check	Local Check	5.0	2.9	2.6	83.3	18.1	68.1	1.5		231.7	0.5	5.8	2.3	3.0	2.6	9.3	15.8	1.9	1.9	1.9	16.2	
11	CKDHH170002	Available	7.2	3.4	3.1	121.2	18.0	66.7	1.5	-1	240.5	0.5	4.2	2.8	2.5	2.4	12.4	10.2	1.8	1.8	1.7	12.4	
14	CKDHH170028	Available	6.8	4.1	3.1	113.9	17.2	66.7	1.2	-2	241.1	0.5	2.7	3.5	2.4	2.7	9.3	11.4	1.6	1.6	2.2	12.0	
15	CKDHH170029	Available	7.1	3.5	2.0	118.6	17.8	67.1	1.3	-5	254.4	0.4	5.6	3.2	2.0	2.5	9.6	9.1	1.7	1.6	2.2	12.1	
13	CKDHH170027	Available	6.5	3.7	2.7	108.8	17.5	66.6	1.6	-2	235.9	0.5	5.6	2.0	2.5	2.6	13.9	11.4	1.6	2.1	2.1	16.9	
Mean			5.97			100	17.18	66.35	1.30		225.54	0.48	10.20	3.33	2.65	2.67	10.89	10.25	1.81	1.82	2.17	13.80	
LSD (0.05)			0.52				0.74	0.84	0.68		6.24	0.02	4.45	2.44	0.25	0.28	7.49	5.17	0.27	0.35	0.40	5.95	
H			0.91				0.87	0.93	0.74		0.97	0.85	0.85	0.06	0.87	0.59	0.57	0.48	0.38	0.04	0.67	0.46	
nLoc			18				14	15	15		17	16	11	2	16	12	6	10	7	4	5	12	

Notes:

ME = Mega-environment; ME-A, -B, -C, -D = Mega-environment A, B, C, D

Opt = Optimum (53, 000 plants) ; HD = high density (80, 000 plants); RS = Random stress; N= Nitrogen; P= phosphorus; pH = soil pH (acidity); MD=Managed drought

Relative grain yield: % grain yield of an entry against the overall trial mean grain yield

Diseases scored on 1-5 scale: 1 = Resistant; 3 = Tolerant, 5 = Highly susceptible

Kernel texture rated on 1-5 scale: 1 = flint, 5= dent

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

SL = Stem lodging expressed as percent of number of plants lodged (stem) to total number of plants in a plot

RL = Root lodging at root expressed as percent of plants lodged to total number of plants in a plot

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Mean yield performance and agronomic attributes of available elite Intermediate maturing CIMMYT pre-commercial hybrids vis-à-vis commercial and internal genetic check hybrids in East Africa 2017 Regional Trial (IHYB17-Set I)

Entry	Hybrid	Comment	ME-A	ME_A	ME-B	ME-C	ME-D	Relative grain yield	Grain Moisture	Days to 50% anthesis	Anthesis-silking Interval (ASI) of the Hybrid	Difference in flowering between Male & Female Parents	Plant height	Ear height	Ears per Plant	Ear Position	Bad Husk Cover	Ear Aspect	Lodging	MLN Score (under Artificial Inoculation at Naivasha)	Common Rust	Leaf Blight	Ear Rots	LGB	MW	
			Opt	HD	MD	Low N	MLN artificial Inoculation																			
			t/ha					%	%	d	d	cm	cm	#	Ratio	HC	EA	(RL)	(SL)	(P.sorg)	(E.turc.)	(ER)	Grain weight loss	Grain weight loss		
															0-1	%	1-5	%	%	1-9	1-5	1-5	#	g	g	
65	DK 777	Commercial Checks	7.1	7.8	0.0	3.3	0.9	119.0	12.9	73	-0.2		234	114	1.0	0.48	8.7	3.0	3.3	4.4	6.0	1.4	1.7	7.9	18.0	5.2
66	DKC90-89	Commercial Checks	5.7	5.1	0.0	3.2	0.4	94.4	12.8	74	1.6		231	115	1.0	0.49	11.4	3.2	5.9	6.4	7.0	2.1	1.9	11.4	4.4	4.2
67	H517	Commercial Checks	4.8	2.4	0.0	3.0	0.3	79.9	13.1	76	3.8		247	135	0.9	0.55	9.5	3.1	5.4	8.7	8.0	1.6	1.9	13.0	7.5	2.3
68	KH500-33A	Commercial Checks	3.9	3.5	0.0	2.4	0.2	64.9	12.7	73	3.0		222	117	0.9	0.55	7.7	3.0	6.8	9.4	8.0	2.1	1.9	16.5	4.9	9.7
69	PAN15	Commercial Checks	5.4	5.6	0.0	3.2	0.2	90.5	13.1	75	1.9		238	120	0.9	0.50	10.7	3.2	6.0	7.8	7.0	1.9	1.7	9.0	4.0	11.2
70	PHB30G19	Commercial Checks	5.3	4.6	0.0	3.5	0.2	87.7	13.0	72	2.6		243	116	0.9	0.49	6.5	2.7	7.9	6.5	8.0	1.9	1.7	9.2	8.0	19.4
71	PHB3253	Commercial Checks	3.3	3.9	0.0	2.7	0.0	55.6	12.4	73	1.9		225	114	0.9	0.50	9.8	3.6	5.4	9.7	8.0	1.9	2.0	20.6	8.3	10.0
72	WE1101	Commercial Checks	3.4	2.5	0.0	2.2	0.2	56.4	13.2	79	2.3		217	113	0.8	0.53	7.6	3.0	7.3	9.3	8.0	1.9	1.8	18.1	13.2	9.3
73	WH403	Commercial Checks	5.2	4.4	0.0	2.9	0.2	86.3	12.9	75	2.7		236	119	0.9	0.51	9.3	2.8	8.4	7.8	7.0	1.8	1.8	7.7	8.6	3.2
74	WH509	Commercial Checks	6.1	4.9	1.3	3.0	0.2	101.7	12.7	77	1.0		257	137	1.0	0.54	8.1	2.6	11.1	8.4	7.0	1.9	1.8	8.2	3.7	14.3
75	Local check	Local Check	5.8	3.6	1.2	3.2	0.0	96.7	12.9	75	2.1		254	134	1.0	0.53	9.2	2.9	11.0	7.7	9.0	1.6	1.8	12.5	5.2	1.1
63	CKH153056	Available	7.5	8.6	1.6	3.7	1.5	125.0	13.2	76	0.7	-6	233	128	1.1	0.56	8.0	2.5	5.8	6.4	6.0	1.8	1.7	8.9	10.8	4.1
Mean			6.00	5.46	0.02	3.3	0.4	100	12.9	74	1.6		241	123	1	0.5	9.2	2.8	6.3	7.2	6.8	1.9	1.8	11.3	6.3	6.3
LSD (0.05)			0.69	2.83	2.26	0.6	0.4		0.6	0.8	0.8		8	6	0.1	0.02	3.7	0.4	4.4	2.7	1.3	0.3	0.2	4.1	11.4	9.0
H			0.84	0.3	0.7	0.5	0.8		0.3	0.9	0.8		0.9	0.9	0.8	0.8	0.6	0.5	0.5	0.5	0.8	0.7	0.5	0.7	-0.1	0.5
nLoc			10	2	1	3	1		4	8	8		6	9	8	7	6	10	4	8	1	2	4	8	1	1

Notes:

ME = Mega-environment; ME-A, -B, -C, -D = Mega-environment A, B, C, D

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Relative grain yield: % grain yield of an entry against the overall trial mean grain yield

Diseases scored on 1-5 scale: 1 = Resistant; 3 = Tolerant, 5 = Highly susceptible

Maize Lethal Necrosis (MLN) score: = 1-9: 1 = Highly resistant; 5 = Tolerant; 9 = Highly susceptible

Kernel texture rated on 1-5 scale: 1 = flint, 5= dent

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

SL = Stem lodging expressed as percent of number of plants lodged (stem) to total number of plants in a plot

RL = Root lodging at root expressed as percent of plants lodged to total number of plants in a plot

LGB: Larger Grain Borer; MW: Maize Weevil

Mean yield performance and agronomic attributes of available elite Intermediate maturity CIMMYT pre-commercial hybrids vis-à-vis commercial and internal genetic check hybrids in East Africa 2017 Regional Trial (IHYB17-Set II)

Entry	Hybrid	Comment	ME-A	ME-B	ME-C	Relative grain yield	Grain Moist.	Grain Text	Days to 50% Anthesis	Anthesis-silking Interval (ASI) of the hybrid	Difference in flowering between Male & Female Parents	Plant height	Ear Position	Bad Husk Cover	Ear Aspect	Plant Aspect	Lodging		Maize Streak Virus	Gray Leaf Spot	Common Rust	Leaf Blight
			Opt	RS	MD												(RL)	(SL)				
			-----t/ha-----			%	%	1-5	d	d	cm	0-1	%	1-5	1-5	%	%	1-5	1-5	1-5	1-5	
62	H517	Commercial check	5.0	1.3	1.0	84.1	19.0	1.9	72.3	2.4		250.6	0.6	6.2	2.9	2.9	2.3	16.4	1.5	1.8	1.9	1.9
63	WH505	Commercial check	5.9	2.6	1.7	98.3	19.1	2.8	71.9	0.4		245.2	0.5	3.0	2.8	2.6	1.8	7.9	2.7	1.5	2.0	1.9
64	Pioneer 30G19	Commercial check	6.0	2.3	1.2	100.3	19.2	2.5	68.6	3.1		241.4	0.5	2.8	2.8	2.6	4.6	8.6	2.1	1.5	1.8	1.7
65	Local Check	Local check	5.8	1.6	1.5	96.2	19.0	2.9	70.4	1.9		238.7	0.5	7.0	2.8	2.8	1.3	14.1	2.5	1.7	1.9	2.2
18	CKDHH170013	Available	6.7	2.9	1.9	111.2	18.1	1.9	69.0	0.5	-5	228.6	0.5	5.4	2.3	2.7	2.0	13.0	0.9	1.6	2.2	2.2
41	CKDHH170059	Available	6.6	3.7	2.0	110.8	18.9	2.8	68.4	1.0	0	255.8	0.4	3.4	2.3	2.5	1.3	12.5	0.9	1.5	1.7	1.9
23	CKDHH170021	Available	6.7	3.2	1.5	112.6	18.0	1.9	69.5	0.6	-4	232.5	0.5	4.5	2.4	2.8	1.7	13.5	1.3	1.6	2.0	2.2
21	CKDHH170018	Available	6.8	3.6	2.2	113.3	18.5	3.5	69.0	1.0	1	246.6	0.5	4.4	2.6	2.7	4.1	14.1	2.0	1.5	2.0	2.1
27	CKDHH170032	Available	6.6	3.3	1.8	110.9	17.8	4.1	68.1	1.1	0	230.3	0.5	10.0	2.4	2.6	0.7	20.1	0.6	1.6	2.1	2.0
44	CKDHH170066	Available	6.6	2.8	0.9	110.0	18.4	3.3	67.6	1.6	2	221.9	0.5	5.7	2.5	2.7	0.9	10.4	0.9	1.7	1.8	1.9
Mean			6.0			100	18.3	2.8	69.6	1.1		232.2	0.5	6.7	2.7	2.8	2.7	13.2	1.5	1.7	1.9	2.1
LSD (0.05)			0.5				0.8	0.7	1.0	1.0		6.7	0.1	3.8	0.2	0.3	2.8	5.5	1.2	0.5	0.3	0.3
H			0.9				0.8	0.8	0.9	0.7		1.0	0.6	0.9	0.9	0.8	0.4	0.5	0.5	0.2	0.5	0.6
nLoc			18				13	2	16	12		15	14	17	17	14	9	10	5	6	7	8

Notes:

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LGB: Larger Grain Borer; MW: Maize Weevil

Mean yield performance and agronomic attributes of available elite Intermediate-late maturing CIMMYT pre-commercial hybrids vis-à-vis commercial and internal genetic check hybrids in East Africa 2017 Regional Trial (ILHYB17)

Entry	Hybrid	Comment	ME-A	ME_A	ME-B	ME-C	Relative grain yield	Grain Moist.	Days to 50% Anthesis	Anthesis-silking Interval (ASI) of the hybrid	Difference in flowering of Male and Female Parents	Plant height	Ear height	Ears per Plant	Ear Position	Bad Husk Cover	Ear Aspect	Grain Texture	Plant Aspect	Lodging	MLN Score (under Artificial Inoculation at Naivasha)	Gray Leaf Spot	Common Rust	Leaf Blight	Ear Rots	LGB	MW	
			Opt	HD	MD	Low N																						Nicking
			t/ha				%	%	d	d	cm	cm	#	0-1	%	1-5	1-5	1-5	%	%	1-9	1-5	1-5	1-5	#	g	g	
61	H520	Commercial Check	4.2	4.0	0.7	2.4	76.4	13.9	78.7	2.5		239	124	0.9	0.52	10.2	2.9	1.4	2.9	4.4	19.1	6	1.5	2.1	2.2	14.6	13.1	2.1
62	KH600-14E	Commercial Check	3.6	3.2	0.2	0.8	65.5	14.3	82.9	3.7		262	151	0.8	0.57	7.2	3.1	2.0	3.1	10.7	15.6	7	1.6	1.8	2.0	24.7	18.8	4.9
63	PAN7M81	Commercial Check	5.1	3.4	0.2	2.3	92.7	14.0	77.3	0.9		235	126	1.1	0.53	8.8	2.9	2.4	2.7	4.5	10.3	9	1.5	1.8	2.1	13.8	15.7	17.9
64	WH505	Commercial Check	5.5	4.0	0.5	2.3	100.0	14.1	79.5	0.6		244	127	1.0	0.52	7.8	2.8	2.4	2.9	5.4	7.2	5	1.5	1.7	1.9	11.1	21.3	8.7
65	WH507	Commercial Check	3.7	4.3	0.4	1.4	67.3	14.2	81.2	1.7		234	119	0.9	0.50	9.2	3.1	2.2	2.9	5.5	13.0	6	1.6	2.4	1.9	14.9	18.4	8.1
66	Local check	local check	4.3	4.3	0.0	2.0	78.2	13.9	80.0	2.5		246	137	0.9	0.54	11.0	3.2	2.2	3.1	5.7	12.4	5	1.6	1.9	1.9	20.1	17.5	16.3
27	CKH150665	Available	6.4	4.1	0.3	3.5	116.4	14.0	79.8	1.1	0	243	122	1.1	0.49	5.3	2.4	1.6	2.6	3.4	11.8	6	1.5	1.9	1.6	8.2	11.8	5.4
47	CKH150686	Available	6.4	4.6	2.0	2.4	116.4	14.1	77.9	2.0	1	240	124	1.2	0.51	10.6	2.6	1.6	2.7	6.4	10.8	5	1.5	2.0	1.7	10.0	11.9	12.7
28	CKH150668	Available	6.5	4.2	0.2	2.0	118.2	13.9	79.3	1.1	0	236	118	1.1	0.49	5.5	2.6	1.6	2.7	4.7	12.3	6	1.5	1.9	1.7	8.4	18.0	4.7
9	CKH153057	Available	6.3	3.5	6.0	2.1	114.5	13.9	78.6	0.8	-5	227	120	1.1	0.52	7.3	2.5	1.6	2.8	4.3	12.1	6	1.5	2.0	1.7	11.2	15.2	2.6
33	CKH150694	Available	6.1	3.5	1.9	2.6	110.9	14.1	76.2	1.9	-1	223	108	1.1	0.49	9.0	2.7	2.0	2.7	5.0	13.4	7	1.5	1.9	1.6	10.4	14.6	11.8
53	CKH153056	Available	6.5	4.3	4.0	3.0	118.2	13.6	78.6	0.4	-6	229	123	1.1	0.53	10.0	2.2	1.8	2.6	4.7	12.4	7	1.5	2.0	1.7	7.9	17.2	7.8
49	CKH150690	Available	6.2	4.6	0.4	2.8	112.7	14.1	77.1	1.6	NA	232	112	1.1	0.48	5.7	2.5	2.4	2.6	4.2	12.8	6	1.5	1.8	1.5	10.8	14.5	19.6
Mean			5.5	4.1	0.6	2.3	100	14.0	78.2	1.3		234.1	118.8	1	0.5	8.9	2.7	2.1	2.8	5	13.2	1.5	1.5	2	1.9	11.9	14.81	10.15
LSD (0.05)			0.6	0.9	1.1	1.6		0.5	1.0	0.6		7.1	5.9	0.1	0.02	3.4	0.2	0.4	0.2	2.8	4.8	0.2	0.2	0.3	0.3	4.2	12.31	11.65
H			0.9	0.4	0.7	0.4		0.4	0.9	0.8		0.9	0.9	0.8	0.8	0.7	0.8	0.8	0.5	0.5	0.7	0.1	0.1	0.8	0.8	0.7	0.19	0.34
nLoc			9	2	1	2		4	10	10		9	9	10	9	8	10	2	6	8	8	3	2	3	6	10	1	1

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