ANNUAL PROGRESS REPORT 2020-21

MAIZE AND MILLETS RESEARCH INSTITUTE, YUSAFWALA, SAHIWAL

CONTENTS

INTRODUCTION

The Institute is located at a distance of 11 kilometers from Sahiwal city towards East on Lahore Multan G. T. road. It is situated at latitude of 30^0 41 N, longitude of 73^0 12 E and the elevation of 175 meters from sea level. The land of Yusafwala, District Sahiwal was converted into Government Seed Farm in the year 1925 and was handed over to the Agriculture Department (Ext. Wing) for multiplication of quality seed of wheat and cotton etc. Research work on maize was started in the 1940's and was abandoned in its infancy with the partition of sub-continent. A regular research work on maize was restarted in the year 1953-54 at Faisalabad. The research and seed production work of maize was transferred to Yusafwala in the year 1958-59. In 1968-69 the status of this farm was raised to a research institute, named as Maize and Millets Research Institute. The main objective of this institute is to conduct research work on maize and millets crops to develop new varieties/hybrids and their seed production on large scale. Maize Research Sub-Station, Faisalabad was established in 1978 and up graded as Research Station in 1990.Hybrid development program was started in 1994. Sorghum Research Sub-Station was established for development work of sorghum crop and an area of 5acres and one office room was allotted from Horticulture section during 2000. During 2008, 1.5 acres were again shifted to Horticulture section and 20 kanal 6 Marla were occupied by the divisional authorities for establishment of modal bazaar during 2012. Now 2 kanal 8 Marla have been occupied by the divisional authorities for establishment of Forensic Science Agency at D.G.Khan recently. Presently 5 kanal are in hand where maintenance and evaluation work of sorghum and pearl millet crops is being done successfully. The Millets Research Station Rawalpindi was established in 1976 to enhance the production of Pearl millet and maize crops through high yielding varieties and modern crop production technology in rain fed areas of Punjab. Maize crop has a significant role in economy due to its diversified industrial consumption. Per hectare yield of maize has been increased from 1890 kg/ha (2001-02) to 5970kg/ha (2020-21) in Punjab due to adoption of hybrids. This institute has released 16 OPV's, 16 hybrids of maize, three varieties and one hybrid of sorghum, and two varieties of pearl millets so far. During this year, two maize hybrids (YH-5482, YH-5568 & YH- 5569) have been approved by the Punjab Seed Council while one maize hybrid YH-5561, one Sorghum hybrid YSH-132 and one Pearl Millet hybrid YBH-278 of this institute were recommended by expert sub-committee on 12/07/2021 for approval in Punjab Seed Council. Moreover one (01) maize hybrid, one pearl millet hybrid, two sorghum hybrids and one sorghum OPV are being tested under DUS studies. Approval of some new hybrids and development of elite hybrids and OPVs will be helpful in self-sufficiency not only in maize hybrid development but best quality sorghum seed will also be available at cheaper rate and also curtail the import of multinational maize and sorghum seed.

HISTORY

Research and seed production of maize and millet crops plus seed production of other major crops continued, normally, on directly cultivated area and Pattadars cultivated area, till 1972. Afterwards, a dispute regarding sharing was started during1973 on the basis/ provisions in Bhutto's Land Reform 1972. Sharing of produce between Pattadars and the Government @ 60% and 40% started implementation on Stay Order, issued on initial hearing of Writ Petition No. 1075/73 by the Lahore High Court, Lahore in the year 1973. During course of hearing, the Maize Botanist changed the Pattanama, unilaterally, and enforced the Pattadars to be agreed on the ratio of 50:50, against which, the Pattadars again filed a writ petition in the Lahore High Court, Lahore that was dismissed, accordingly, on 03-05-1981. Against the decision of Lahore High Court, the Pattadars filed an appeal (CPLA NO. 813/1981) in the Honorable Supreme Court of Pakistan. The Supreme Court of Pakistan disposed of the above petition on 17-07-1988 that the petitioners are allowed to settle the matter with the Govt. out of court. In the light of above CPLA, the Government of Punjab, Agriculture Department agreed on sharing ratios of 60:40 on 25-10-1989.

The Government of Punjab, Agriculture Department, Lahore, again wrongly, enhanced the share to 50:50 on 28-02-1993. Against which the Pattadars again filed a writ petition in Lahore High Court

Lahore, vide No. 5967/93 which was decided in favor of Pattadars by the Lahore High Court Lahore, on 24-11-1994. Against the above decision, the Govt. of Punjab, Agriculture Department filed a Civil Appeal in the Supreme Court of Pakistan vide No. 221/1995 which was dismissed on 03-05-2002.On the dismissal of above appeal, Govt. of the Punjab, Agriculture Department, filed a Civil Review Petition No. 84/2002 that was also dismissed on 26-05-2004 that the Government is not competent to change the share from 60:40 to 50:50 unilaterally.

Govt. of the Punjab, Agriculture Department, Lahore, accepted the above decision of the Supreme Court of Pakistan and offered the Pattadars to get renew the Pattanama verbally as well as through newspaper but almost all of them refused to do so and went on deadlock/non-sharing since Kharif 2000. Since then, the Ex-Pattadars are indulging the administration of the Institute in numerous false, baseless & frivolous cases which is a big hurdle in smooth running of the research at Yusafwala, result being, less comparatively varietal development and production technology.

SEASON AND ITS EFFECTS

Meteorological data of Yusafwala for the financial years 2019-20 and 2020-21 are given below. During the year 2020-2021, total 315.3 mm rainfall was received.

Table 1: Summary of Metrological Data at MMRI

Sr. No.	**Month**	**Average temperature ^{O}C**				**Rainfall (mm)**	
		Maximum		**Minimum**			
		(2019-20)	**(2020-21)**	**(2019-20)**	**(2020-21)**	**(2019-20)**	**(2020-2021)**
1	July	41.41	46.00	28.60	23.00	48.81	113
2	August	40.16	44.00	28.30	25.00	101.50	82.8
3	September	40.23	42.00	27.66	24.00	-	9.8
4	October	31.90	39.00	1941	13.00	11.40	-
5	November	27.56	33.00	12.83	08.00	-	13.8
6	December	18.00	28.00	6.35	03.00	12.00	6.6
7	January	15.32	25.00	5.52	03.00	46.00	25.1
8	February	23.64	34.00	5.00	05.00	7.20	-
9	March	26.45	35.00	14.41	12.00	120.30	26.8
10	April	35.93	42.00	19.20	14.00	4.40	7.4
11	May	38.93	44.00	23.38	24.00	18.00	15.00
12	June	41.36	44.00	21.00	24.00	31.00	15.00
Total Rainfall =						**260.60**	**315.3**

YUSAFWALA - SAHIWAL (HEADQUARTER)
MAIZE (*Zea mays* L)

HYBRID MAIZE (YELLOW)
KHARIF 2020:
Germplasm Maintenance

1.1 Maintenance of elite Inbred Lines

Four hundred and ten (410) elite inbred lines were sown ear to row on 19-08-2020 for maintenance during Kharif-2020. The material was sown in such a way that after every two lines, one line was kept fallow to reduce the chance of foreign pollen contamination during hand pollination and to facilitate the breeding work. All these lines were maintained by self-pollination and harvested for next cycle of maintenance and purification considering their true to type behavior and other desirable parameters. Germination was not up to the mark due to rain just after the sowing. Gap filling was done. Data regarding root anthocyanin, leaf sheath anthocyanin, margin serration, leaf margin wave, sheath hairs, leaf senescence, days to 50% tasseling, days to 50% silking, fertility of anthers, pollen shedding, anther color, pollen color, glume color and silk color were recorded of all the lines separately.

1.2 Maintenance of Pre-Elite inbred lines/families

Thirty-one (31) pre-elite families of 13 inbred lines, including dent derivatives and flint derivatives which have achieved the status of purity were merged into Pre-Elite inbred lines, were sown ear to row on 19-08-2020 for maintenance and purification through hand pollination. Harvesting of all the lines has been completed. Seed preparation of the inbred lines was completed for sowing in Spring-2021. Germination was not up to the mark due to rain just after the sowing, Gap filling was done to achieve optimum plant density.

1.3 Derivation of Inbred Lines / Families

Sowing of three hundred and forty two (342) derivatives including dent & flint derivatives were completed on 19-08-2020 for derivation through hand pollination during Kharif-2020. The sowing was planned in such a way that after every two lines, one line was kept blank to facilitate the breeding work and to avoid the foreign pollen contamination during self-pollination. All the derivatives were fully self-pollinated through hand pollination.

1.4 Stalk Rot Inoculation (*Fusarium verticilioides*) and Selection of resistant germplasm

All inbred lines (Elite and Pre-Elite) and hybrids were inoculated with stalk rot fungus (*Fusarium verticilioides,* formerly called *Fusarium moniliforme*) at the time of pollination stage to evaluate their resistance. Scoring points from 1-5 were given to each inoculated plant at the time of harvesting. Score (1-3) was given to a plant when spreading of disease was within inoculated internode and score 4 or 5, when disease infection was within 2nd or 3rd internode. Plant with 1-3 score (infection within inoculated internode) were selected and harvested to collect their seeds for next cycle of inoculation and selection in spring 2021.

2 Hybrid Constitution through Open Pollination (Crossing Block)

2.1 Isolation No. 1

Sowing of thirty two (32) female inbred lines with one male Y-27 in an isolation block was done for constitution of new single crosses on 24-08-2020. Off-type plants were roughed out. All the lines were harvested to collect crossed seed for sowing and evaluation in spring-21.

2.2 Isolation No. 2

Sowing of thirty two (32) female inbred lines with one male P-222 for new single cross constitution in isolation in Colony area was done on 24-08-2020. Off-type plants were rogued out. All the lines were harvested to collect crossed seed for sowing and evaluation in spring-21.

2.3 Isolation No. 3

Sowing of thirty (30) female inbred lines with one male Dr-37 for new single cross constitution in isolation block was done on 24-08-2020. Off-type plants were rogued out. All the lines were harvested to collect crossed seed for sowing and evaluation in spring-21.

2.4 Isolation No.4

Sowing of seven (7) female inbred lines with one male Dr-51 for new single cross constitution in isolation block was done on 27-08-2020. Off-type plants were rogued out. All the lines were harvested to collect crossed seed for sowing and evaluation in spring-21.

2.5 Isolation No.5

Sowing of thirty three (33) female inbred lines with one male Y-36 for new single cross constitution in isolation block was done on 18-08-2020. Off-type plants were rogued out. All the lines were harvested to collect crossed seed for sowing and evaluation in spring-21.

3 Hybrid Evaluation
Replicated Yield Trials

3.1 Preliminary Hybrid Maize Yield Trial No. 1. Kharif-2020

This trial was comprised of thirty-six (36) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4 m x 0.75 m x 1. The data regarding various parameters are presented in the following table.

Table 2: Results of Preliminary Hybrid Maize Yield Trial No. 1. Kharif-2020

E. No.	Hybrid code	Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
20	YH-5852	14252a	17	18	50.5	52.5	**155**	85	18
18	YH-5758	14150ab	20	20	48.5	51	192.5	97.5	20
14	YH-5632-3	14127abcd	17	18	50	52	197.5	97.5	18
19	YH-5851	14061abcd	18	18	50	52.5	172.5	85	18
28	YH-5432	14046abcd	19	19	51.5	54	175	97.5	19
8	YH-5683-1	14012abcde	20	20	48.5	50.5	175	80	20
32	YH-5427	14001abcdef	19	19	49	51.5	170	82.5	19
10	YH-5850	13993bcdefg	18	18	46.5	**49**	190	90	18
26	YH-5711	13921bcdefgh	18	18	48	50.5	222.5	112.5	18

13	YH-5632-2	13917bcdefghi	18	18	51.5	53.5	212.5	110	18
3	YH-5845	13846bcdefghi	18	18	49	51	103.8	107.5	18
24	YH-5762	13805bcdefghi	19	19	52	54.5	205	97.5	19
15	YH-5669	13666bcdefghi	19	19	50.5	52.5	180	85	19
12	YH-5632-1	13375bcdefghi	18	18	49.5	52	182.5	90	18
23	YH-5761-2	13356bcdefghi	18	18	50.5	52.5	177.5	92.5	18
6	YH-5749	13225bcdefghi	19	19	50	52.5	202.5	112.5	19
33	FH-1046	12925bcdefghi	18	18	51.5	54	190	115	18
31	YH-5776	12923cdefghi	18	18	50	51.5	182.5	85	18
2	YH-5844	12899defghi	19	19	52	54	185	100	19
7	YH-5849	12721defghi	18	18	46.5	**49**	180	92.5	18
17	YH-5756	12465defghi	20	20	49.5	51.5	165	90	20
21	YH-5853	12369efghi	18	18	51	53.5	170	**77.5**	18
36	S-7720	11859efghij	18	18	51.5	53.5	212.5	112.5	18
9	YH-5883-2	11777efghij	18	18	51	53.5	177.5	85	18
11	YH-5750	11711fghij	18	18	48.5	51	190	90	18
4	YH-5846	11450fghij	18	18	50	52.5	185	95	18
30	YH-5766	11439ghij	19	19	48.5	51.5	177.5	92.5	19
35	30T-60	11439ghij	18	18	54	**56**	**250**	**137.5**	18
5	YH-5847	11415ghij	18	18	50	52	190	102.5	18
16	YH-5755	11365ghij	18	18	49.5	52	182.5	92.5	18
27	YH-5856	11333hij	18	18	52	54	192.5	107.5	18
34	YH-1898	11159ij	20	19	53	55	192.5	112.5	19
22	YH-5854	11020ij	19	19	48.5	51.5	187.5	85	19
25	YH-5855	10862ij	19	19	48.5	51.5	202.5	95	19
29	YH-5857	10685j	17	18	47	**49**	177.5	90	18
1	YH-5843	10245j	19	18	52.5	54.5	175	100	18
Cd		**4079**	**20.00**	**22.0**	**3.7**	**NS**	**NS**	**7.63**	**NS**
CV % (LSD)		**21.3**	**10.0**	**11.2**	**3.6**	**3.5**	**14.7**	**28.1**	**11**

It is evident from the results presented in the above table that significant differences were found among thirty-six hybrids for yield, days to silking. Local promising hybrid YH-5852 remained at top position by giving grain yield of 14252 kg/ha followed by hybrid YH-5758 and YH-5632-3 which gave grain yield of 14150 kg/ha&14127 kg/ha respectively Local Hybrid-YH- 5850, 5849 and 5857 seemed to be early maturing by taking 49 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid while Commercial hybrid 30T60 was late maturing. The commercial hybrid 30T-60 showed maximum plant height (250 cm) while local hybrid YH-5852 showed minimum plant height (155 cm). YH-5853 showed lowest cob bearing (77.5cm) while 30-T-60 showed highest cob bearing (137.5 cm).

3.2 Preliminary Hybrid Maize Yield Trial No. 2, Kharif -2020

This trial was comprised of thirty-six (36) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4 m x 0.75 m x 1. The data regarding various parameters are presented in the following table.

Table 3: Results of Preliminary Hybrid Maize Yield Trial No. 2. Kharif-2020

E. No.	Hybrid code	Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
10	YH-5867	14874a	17	18	49	51	197.5	110	18
11	YH-5868	14832ab	19	19	49.5	51.5	182.5	102.5	18
2	YH-5859	14803abc	19	19	47.5	49	180	102.5	19
29	YH-5884	14768abc	18	18	49	51	227.5	117.5	18
20	YH-5877	14684abcd	18	18	49	50.5	162.5	80	20
33	FH-1046	14504abcde	19	19	51	53	202.5	117.5	18
27	YH-5861-1	14444abcde	17	18	49	51	197.5	110	18
30	YH-5885	14348abcde	19	19	50	52	200	105	19
36	S-7720	14335abcde	18	21	52	55	**242.5**	**132.5**	18
17	YH-5874	14251abcde	20	20	24.5	53	**87.5**	**32.5**	20
18	YH-5875	14211abcde	18	20	48.5	51	170	87.5	20
14	YH-5871	14150abcde	18	18	52.5	54.5	172.5	87.5	18
22	YH-5879	14126abcde	19	19	50.5	53	180	87.5	19
19	YH-5876	14060abcdef	18	18	48	49.5	172.5	87.5	18
21	YH-5878	14046abcdef	18	18	49.5	51	170	92.5	18
1	YH-5777	14011abcdefg	18	18	52	54	197.5	105	20
26	YH-5883	14000abcdefg	19	19	49	51	177.5	102.5	19
15	YH-5872	13992bcdefg	19	19	53	55	190	105	19
8	YH-5865	13920cdefg	20	20	49	51	182.5	90	20
31	YH-5848	13917cdefg	18	18	49.5	51.5	197.5	92.5	20
32	YH-5427	13900cdefg	20	20	49.5	51.5	192.5	105	19
12	YH-5869	13880cdefg	18	18	49	51	175	87.5	18
7	YH-5864	13856cdefg	18	18	46.5	**48.5**	180	80	18
24	YH-5881	13845cdefg	19	19	49	51	180	92.5	19
16	YH-5873	13805defgh	18	18	50.5	53	167.5	72.5	18
9	YH-5866	13665defgh	18	18	48.5	50.5	180	87.5	18
25	YH-5882	13501defgh	19	19	48	50	192.5	92.5	19
4	YH-5861	13484defgh	19	20	49	51	170	90	18
23	YH-5880	13430efgh	18	18	50.5	53	192.5	92.5	18
6	YH-5863	13374efgh	19	19	47	49	177.5	87.5	19
34	YH-1898	13220efgh	19	19	51	53	187.5	107.5	19
3	YH-5860	13176fghi	18	18	47	49	177.5	82.5	19
35	30T-60	12749ghi	20	20	53	**56**	230	120	18
28	YH-5764	12621ghi	19	19	49	51	192.5	90	19
13	YH-5870	12337hi	18	18	50.5	52.5	177.5	95	18
5	YH-5862	12306i	19	19	48.5	50.5	182.5	92.5	18
CV%(LSD)		**25.0**	**11.00**	**12.55**	**12.6**	**12.6**	**12.7**	**27.8**	**11**
Cd		**3955**	**6.2**	**5.4**	**12.5**	**13.2**	**47.4**	**24.2**	**NS**

It is evident from the results presented in the above table that significant differences were found among thirty six hybrids for yield, days to silking and plants harvested. Local Hybrid YH-5867 remained at top position by giving grain yield 14874 kg/ha followed by local hybrid YH-5868& YH-5859

gave grain yield 14832 kg/ha and 14803 kg/ha respectively. Local hybrid YH-5864 seemed to be early maturing by taking 48.5 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid while 30-T-60 was late maturing (56). Commercial hybrid S-7720 showed maximum plant height (242.5 cm) while local hybrid YH-5874 showed minimum plant height (87.5cm). YH-5874 showed lowest cob bearing (32.5 cm) while commercial hybrid S-7720showed highest cob bearing (132.5 cm).

3.3 Preliminary Hybrid Maize Yield Trial No. 3, Kharif -2020.

This trial was comprised of thirty-six (36) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4 m x 0.75 m x 1. The data regarding various parameters are presented in the following table.

Table 4: Results of Preliminary Hybrid Maize Yield Trial No. 3. Kharif-2020

E. No.	Hybrid code	Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
13	YH-5898	14992a	18	20	50.5	53	202.5	107.5	20
9	YH-5894	14941ab	22	22	51	53	190	105	19
21	YH-5906	14941b	19	19	52.5	54.5	187.5	110	18
8	YH-5893	14893bc	20	20	50.5	52.5	212.5	107.5	18
22	YH-5907	14849bc	20	20	49.5	52	190	90	20
24	YH-5809	14426bcd	20	21	52.5	54.5	207.5	105	19
14	YH-5899	14229bcd	20	20	49.5	52	217.5	105	18
32	YH-5427	14186bcde	19	19	49	51	182.5	100	19
1	YH-5886	14010bcde	21	22	52	54	180	90	18
31	YH-5916	13556bcdef	19	19	48.5	50.5	185	107.5	20
20	YH-5905	13459bcdefg	20	20	51.5	53.5	157.5	90	20
12	YH-5897	13425bcdefg	20	20	50	52.5	152.5	110	20
27	YH-5912	13418bcdefg	22	22	52	54.5	210	110	18
15	YH-5900	13377bcdefg	21	21	50	52.5	187.5	92.5	19
33	FH-1046	13285bcdefgh	22	22	52.5	55	200	115	18
36	S-7720	13066bcdefgh	20	21	51.5	54	242.5	127.5	19
6	YH-5891	12859bcdefghi	20	20	51	53.5	192.5	112.5	20
26	YH-5911	12826bcdefghij	21	21	50.5	53	187.5	115	19
2	YH-5887	12816bcdefghijk	22	22	53	55	170	90	20
34	YH-1898	12644defghijk	21	21	51	53	200	117.5	20
11	YH-5896	12632defghijk	19	19	50	52.5	175	90	19
16	YH-5901	12447efghijk	22	22	49.5	51.5	175	87.5	18
30	YH-5915	12425efghijk	19	19	49	51	177.5	100	20
23	YH-5908	11803fghijk	20	20	51	53	177.5	105	18
35	30T-60	11722fghijkl	18	20	52.5	55	**270**	145	18
19	YH-5904	11428fghijkl	22	22	52	54	175	97.5	19
25	YH-5910	11291ghijkl	21	21	48.5	51	190	100	20
29	YH-5914	11192hijkl	19	19	52	54	**142.5**	82.5	19
4	YH-5889	11183ijklm	21	21	53	55.5	185	107.5	19
3	YH-5888	11152ijklm	21	21	52	54	187.5	100	20

7	YH-5892	10780jklm	22	22	50.5	52.5	177.5	92.5	20
17	YH-5902	10776jklm	21	21	48	**50**	175	102.5	18
10	YH-5895	10610klm	19	19	53	55.5	157.5	**80**	19
5	YH-5890	9980lm	18	20	53.5	56	177.5	107.5	20
18	YH-5903	9434lm	17	20	51.5	54	190	105	20
28	YH-5913	8970m	18	21	56	**58.5**	145	**80**	20
CV%(LSD)		**21.5**	**8.00**	**8.7**	**2.3**	**2.4**	**10.58**	**26.8**	**5**
Cd		**3675**	**6.00**	**6.5**	**2.4**	**2.6**	**40.2**	**18.0**	**NS**

It is evident from the results presented in the above table that significant differences were found among thirty six hybrids for all characters. Local hybrid YH-5898 remained at top position and gave yield 14992 kg/ha followed by local hybrid YH-5894 by giving grain yield 1494 kg/ha. Local hybrid YH-5902 seemed to be early maturing by taking 50 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid. WhileYh-5913 was late maturing (58.5). Local hybrid YH-5895 & 5913 showed lowest cob bearing (80 cm). The commercial hybrid 30-T-60 showed maximum plant height (270cm) while YH-5914 showed minimum plant height (142.5cm).

3.4 Preliminary Hybrid Maize Yield Trial No. 4, Kharif -2020.

This trial was comprised of thirty-six (36) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4 m x 0.75 m x 1. The data regarding various parameters are presented in the following table.

Table 5: Results of Preliminary Hybrid Maize Yield Trial No. 4. Kharif-2020

E. No.	Hybrid code	Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
9	YH-5925	14310a	20	20	50	**51**	187.5	110	19
21	YH-5937	14208a	18	22	51	53	175	95	19
13	YH-5929	14115ab	21	21	54.5	55.5	207.5	122.5	19
8	YH-5924	14113ab	19	19	49.5	51.5	192.5	102.5	20
22	YH-5938	14113ab	21	21	50.5	53	182.5	110	18
24	YH-5940	14111abc	19	19	52.5	54.5	182.5	102.5	20
14	YH-5930	14110abc	20	20	52.5	53.5	190	97.5	19
32	FH-1046	14108abcd	20	20	51	53	202.5	122.5	20
1	YH-5917	14010abcd	18	21	53.5	55.5	192.5	112.5	18
31	YH-5427	13556abcd	22	22	49	**51**	**170**	90	18
20	YH-5936	13459abcde	21	21	51	53	197.5	105	20
12	YH-5928	13425abcde	22	22	55	56	207.5	112.5	20
27	YH-5943	13418abcde	21	20	49	**51**	220	125	18
15	YH-5931	13377abcde	18	19	51.5	52.5	197.5	110	18
33	YH-1898	13285abcde	17	19	49.5	51.5	175	100	20
36	DK-6789	13066abcde	19	20	54	56	212.5	115	19
6	YH-5922	12859abcdef	22	22	52	54	180	107.5	19
26	YH-5942	12826abcdef	19	19	52.5	55	185	**85**	19
2	YH-5918	12816abcdef	19	19	50.5	52.5	172.5	100	19
34	30T-60	12644abcdef	20	20	51.5	53.5	**247.5**	**143**	19

11	YH-5927	12632abcdefg	21	22	51.5	53	190	102.5	18
16	YH-5932	12447bcdefgh	20	20	49	50	172.5	85	18
30	YH-5946	12425bcdefgh	21	21	49.5	51.5	185	110	19
23	YH-5939	11803bcdefgh	21	21	49	**51**	190	100	20
35	S-7720	11722bcdefgh	20	20	52	54	230	117.5	19
19	YH-5935	11428bcdefgh	22	22	51.5	53.5	185	105	20
25	YH-5941	11291bcdefgh	19	19	49	**51**	172.5	95	20
29	YH-5945	11192bcdefgh	21	21	51	53.5	197.5	112.5	19
4	YH-5920	11183cdefgh	21	21	52	54.5	192.5	102.5	19
3	YH-5919	11152cdefgh	22	22	50	52	172.5	105	19
7	YH-5923	10780defgh	18	22	48.5	50.5	180	110	18
17	YH-5933	10776efgh	19	19	52	54	175	90	20
10	YH-5926	10610efgh	19	19	49	50	187.5	90	18
5	YH-5921	998fgh	19	19	50	52	180	95	19
18	YH-5934	9434gh	20	20	50.5	52.5	185	100	20
28	YH-5944	8970h	21	21	50.5	52.5	200	115	19
CV%(LSD)		**27.7**	**9.8**	**10.7**	**1.92**	**1.92**	**5.5**	**30.2**	**5.9**
Cd		**4641**	**6.9**	**6.8**	**2.0**	**2.05**	**21.4**	**22.9**	**NS**

It is evident from the results presented in the above table that significant differences were found among thirty-six hybrids for all characters. local Hybrid YH-5925 remained at top position by giving yield 14309 kg/ha followed by local hybrids YH-5937& YH-5929 by giving yield 14208 kg/ha &14114 kg/ha respectively. Local hybrids YH-5925, YH-5427, and YH-5943 seemed to be early maturing by taking 51 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid. While commercial hybrid Dk-6789 remained late maturing (56). Commercial hybrid 30T60 showed maximum plant height and cob height i.e (247 cm&143cm) while local hybrid YH-5427 showed minimum plant height (170 cm). YH-5942 showed lowest cob bearing (85 cm).

3.5 Preliminary Hybrid Maize Yield Trial No. 5, Kharif -2020.

This trial was comprised of twenty-six (26) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4 m x 0.75 m x 1. The data regarding various parameters are presented in the following table.

Table 6: Results of Preliminary Hybrid Maize Yield Trial No. 5. Kharif-2020

E. No.	Hybrid code	Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
17	YH-5951	14054a	19	19	53	55	185	110	19
13	YH-5979	13072a	21	21	52.5	54.5	210	110	19
6	YH-5972	12717ab	19	19	53	55	250	**137.5**	18
11	YH-5977	12707abc	20	20	54	56	197.5	100	18
14	YH-5980	12465abc	22	22	53.5	56	222.5	120	19
7	YH-5973	11962abcd	19	19	56.5	58.5	225	130	19
3	YH-5969	11854abcd	22	22	53.5	55.5	175	92.5	19
2	YH-5968	11738abcde	19	19	50.5	**53**	217.5	115	18
22	Stalwart-38	11727abcde	18	20	53.5	55.5	177.5	95	20

21	Stalwart-50	11709abcde	21	21	52.5	55	**102**	**57.5**	18
8	YH-5974	11649abcde	21	22	56.5	**59**	205	115	19
15	YH-5949	11315abcde	19	19	52	54	187.5	105	20
5	YH-5971	11310abcde	21	21	51	**53**	222.5	110	18
23	YH-5427	11305abcde	19	19	51	53.5	182.5	115	18
1	YH-5967	11202abcde	18	19	54	56.5	195	100	19
24	FH-1046	11145abcde	20	20	52.5	55	190	122.5	19
26	30T-60	11117bcdef	19	22	54	56	230	110	20
19	YH-5953	10736cdef	19	19	51	53	190	100	19
25	YH-1898	10677cdef	19	19	53.5	55.5	192.5	92.5	19
4	YH-5970	10559def	18	19	55	57.5	**250**	110	20
20	YH-5954	10499def	19	19	52.5	55	162.5	87.5	18
10	YH-5976	8922efg	22	22	52	54	195	107.5	18
9	YH-5975	8393fgh	22	22	52.5	54.5	177.5	95	19
16	YH-5950	7682fgh	22	22	53	55	160	70	19
12	YH-5978	2763gh	18	20	55.5	57.5	135	60	20
18	YH-5952	2763h	18	20	55.5	57.5	135	60	20
CV%(LSD)		**20.9**	**10.0**	**11.0**	**3.3**	**3.6**	**6.91**	**21.56**	**4.7**
Cd		**3284**	**6.7**	**6.7**	**2.7**	**2.9**	**19.8**	**15.6**	**NS**

It is evident from the results presented in the above Table that significant differences were found among twenty six hybrids for all characters. Local hybrid YH-5951 remained at top position by giving grain yield 14054 kg/ha followed by local hybrid YH-5979which gave yield 13071 kg/ha. Local hybrid YH-5968 & YH-5971 seemed to be early maturing by taking 53 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid. While local hybrid YH-5974 remained late maturing (59). Local hybrid YH-5970 showed maximum plant height 250 cm while ST-50 showed lowest plant height (102cm) ST-50showed lowest cob bearing (57 cm).

3.6 Demonstration of Local Maize hybrid in comparison to commercial hybrids Kharif 2020

This trial was comprised of thirteen (13) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in strips. Plot size was kept 4mx0.75mx33. The data regarding various parameters are presented in the following table.

Table 7: Results of Demonstration-1. Kharif-2020

E. No.	Hybrid code	Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
6	YH-5568	13360	100	100	51	53	250	130	100
12	30T-60	13313	100	100	51	54	250	140	100
13	YH-5482	12907	100	100	50	53	205	100	100
5	YH-5569	12553	100	100	51	54	220	105	100
8	YH-5732	12367	100	100	54	56	185	100	100
7	YH-5561	12087	100	100	51	53	230	115	100
9	YH-5427	12067	100	100	52	55	190	105	100
3	YH-5395	12047	100	100	52	55	185	90	100
10	FH-1046	11133	100	100	51	53	225	130	100

11	YH-1898	9733	100	100	51	54	200	110	100
2	YH-5675	9607	100	100	53	56	195	95	100
1	YH-5404	9013	100	100	52	55	200	100	100
4	YH-5679	8707	100	100	51	53	185	95	100

The above table depicted the performance of thirteen hybrids. Local hybrid YH-5568 remained at top position by giving 13360 kg/ha followed by commercial hybrid 30T-60 by giving yield (13313 kg/ha).

3.7 National Uniform Maize Hybrid Yield Trial (first year testing) Kharif 2020

This trial was planted with one hundred and seventeen (117) entries having plot size of 4mx0.75mx2 with three replications using Alpha Lattice design. The data regarding various parameters are presented in the following table.

Table 8: National Uniform Maize Hybrid Yield Trial (1st year testing) Kharif 2020

E. No.	Hybrid code	Yield Kg/ha	Stalk yield	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
18	T-9211	12502	18.1	36.7	51.3	54.3	248.3	135.0	33.7
10	S-1682	11969	23.0	34.3	53.0	55.7	248.3	140.0	35.3
103	SOHRAB	11698	20.0	34.3	52.7	54.0	242.0	128.7	33.0
105	A-6060-J	11690	22.7	39.3	53.3	56.0	235.0	139.3	36.7
6	OGS-0361	11308	24.7	35.3	51.3	54.3	248.3	133.7	32.3
5	AS-377	11066	20.2	41.3	51.7	54.3	243.7	133.7	37.3
78	FS-786	11011	20.2	31.0	51.7	54.0	241.0	130.7	33.3
114	NK-7468	10950	17.2	39.0	53.0	55.0	245.0	135.7	36.0
15	GMS-7820	10867	15.2	39.3	52.7	54.7	233.7	126.0	34.0
48	7726	10819	14.9	36.0	52.7	56.0	234.3	132.3	35.0
8	SS-2626	10795	21.8	35.7	51.3	54.0	230.0	126.7	37.7
40	AS-8487	10777	15.0	36.3	53.0	55.3	243.3	145.7	34.3
99	20R99	10701	15.3	34.3	52.3	54.0	236.0	139.7	35.0
52	S-6745	10641	19.4	34.3	52.0	54.3	236.0	136.0	36.0
101	SHAHZOR	10585	18.6	32.0	53.0	55.0	269.3	159.7	32.7
96	R-899	10524	11.8	31.3	51.3	54.0	251.7	141.0	28.3
25	S-2266	10515	9.2	35.0	52.0	53.3	223.3	123.3	37.7
28	33M55	10490	12.1	33.0	51.3	53.7	251.0	150.7	34.3
92	P-4040 (CHECK)	10472	9.9	36.0	52.3	55.0	250.0	137.7	39.0
75	810	10443	15.2	32.0	50.3	**52.7**	227.7	125.7	32.7
19	Z-7722	10217	15.1	34.3	52.0	54.0	239.3	127.7	39.3
108	NE-3381	9996	20.1	32.7	54.0	55.3	236.7	140.7	32.3
3	LG-9298	9924	16.9	34.0	52.3	55.0	242.0	124.7	34.0
21	NIRALA-07	9835	9.1	32.3	52.3	55.0	238.3	137.3	32.0
67	NSS-756	9783	15.0	30.3	52.3	55.3	224.3	130.7	27.3
4	T-4151	9767	13.9	30.0	54.7	56.3	239.3	127.7	31.7

30	SS-1339	9707	13.7	33.0	52.7	55.3	232.7	139.7	37.0
43	ES-3339	9653	10.5	32.3	54.7	56.3	248.3	131.0	28.7
100	BS-588	9630	21.6	34.3	51.3	53.3	245.0	130.7	36.7
58	FF-2525 W	9607	18.8	25.0	51.0	53.3	174.0	112.3	22.7
37	ANMOLE 1122	9593	9.8	32.7	52.7	53.7	246.0	144.7	30.3
86	BS-978	9475	18.5	30.0	53.3	56.0	227.7	126.3	36.3
29	BS-2442	9364	10.6	32.0	52.3	54.0	240.0	124.3	29.0
55	AS-4284	9346	15.3	27.7	52.7	55.0	233.7	130.0	28.3
74	P-3230W	9296	15.2	28.3	52.7	54.7	219.3	123.0	28.3
110	NE-222	9206	18.1	29.3	53.7	56.0	235.0	146.0	29.3
12	BS-561	9204	19.8	31.0	54.0	55.3	226.0	147.7	34.0
24	OGS-0261	9170	10.6	29.7	56.7	57.7	266.0	151.0	27.7
34	IS-6381	9124	7.8	28.0	51.3	53.0	234.3	125.7	32.3
93	AS-6818	9122	16.0	32.7	53.3	55.3	258.3	165.0	32.0
107	H-555	9102	18.9	29.0	51.7	54.0	228.7	136.0	31.3
111	T-266	9055	15.1	27.3	52.3	54.7	225.0	130.0	28.7
31	AS-376	9033	14.6	27.3	56.3	58.7	275.0	145.7	28.0
66	FF-2020 Y	8997	12.3	27.7	51.0	53.7	233.7	141.7	29.0
2	SPARK-939	8906	14.2	33.0	55.0	56.3	231.0	138.7	31.3
36	TG-YM-960	8904	14.8	32.3	55.0	56.3	236.0	134.7	27.3
56	NS-9786	8900	11.6	31.0	52.3	55.0	235.0	133.7	33.0
104	YG-7719	8886	18.1	33.7	52.3	54.7	233.7	130.0	34.3
97	MSY70	8870	12.3	30.0	53.0	55.7	239.3	144.3	34.0
60	TS-6566	8833	20.4	30.3	52.0	55.0	224.3	131.0	27.7
113	AA-1938	8806	14.6	26.0	53.0	55.3	232.0	137.7	24.3
116	C-920	8782	14.8	23.7	53.3	55.0	228.7	125.0	26.0
41	FF-2222 W	8753	15.7	28.0	52.7	54.0	216.7	108.3	26.7
82	SS-9987	8752	13.1	29.0	56.0	57.7	216.7	124.0	32.7
51	828	8729	17.9	29.3	53.0	55.7	228.7	132.7	32.0
81	SB-5147	8685	13.2	31.3	55.7	58.3	216.0	128.0	32.3
80	1375	8670	11.7	30.0	54.7	58.0	218.7	118.3	29.0
26	G-4	8622	11.0	31.0	55.3	56.7	221.7	128.7	32.3
89	BS-3712	8543	17.4	28.0	52.7	55.7	232.7	131.7	29.3
17	D-6619	8515	20.3	32.3	54.0	55.7	226.0	134.3	32.7
65	NSS-119	8514	13.6	30.3	54.0	56.7	212.0	112.3	28.0
44	SD-7799	8481	14.9	25.0	54.0	56.0	216.0	119.7	22.7
106	W-4550	8341	18.2	29.0	51.7	54.0	211.3	119.3	25.7
13	WS-2465	8328	14.9	23.7	53.3	55.3	226.0	129.3	24.3
71	24M26	8308	11.9	22.0	52.7	55.7	216.0	117.3	26.0
95	NK-7449	8264	15.1	33.3	59.3	**62.7**	266.0	153.3	26.7
88	QS-399	8195	19.6	30.7	54.7	56.7	221.0	126.0	33.0
87	TG-YM-5014	7981	18.5	28.3	54.3	56.7	205.3	120.7	33.3

68	AS-7777	7965	5.9	25.7	53.0	54.3	238.3	142.3	24.0
73	24M28	7888	8.1	24.7	54.0	56.0	219.0	129.3	26.7
62	H-4142	7876	14.5	29.0	51.0	53.0	208.7	119.7	27.7
61	RB-9790	7806	14.9	26.3	53.0	55.3	221.7	132.3	22.3
76	BS-636	7796	12.3	29.7	53.0	55.3	236.0	137.3	31.7
79	AG-603	7734	14.3	25.0	54.7	56.3	226.0	121.7	23.7
50	5287	7728	9.4	25.7	54.0	56.3	222.0	123.0	30.0
85	IS-7381	7710	16.6	26.7	54.0	56.3	222.7	121.7	33.0
98	CS-2Y10 (CHECK)	7696	15.3	29.7	49.3	51.3	216.7	124.3	30.3
91	MSMHYB	7660	15.3	26.7	49.0	**50.7**	246.7	125.7	29.7
35	GT-722	7636	14.9	22.7	54.7	57.0	233.7	137.3	21.0
1	SS-537	7563	12.2	30.0	52.3	55.3	223.7	133.0	29.7
47	Q.S-199	7504	8.2	24.0	53.7	55.7	238.7	125.7	25.7
77	TAWANA-236	7288	9.1	22.3	54.7	56.3	229.3	140.7	23.3
39	BS-9191	7262	9.8	28.0	51.3	53.0	245.0	133.7	31.3
57	BF-9999	7221	19.5	25.0	53.0	55.7	217.0	128.0	22.7
9	BS-222	7209	16.8	26.7	54.0	55.7	182.0	131.0	29.3
27	FD-30	6852	12.6	21.3	55.0	57.3	216.3	115.7	17.7
22	D-4464	6641	12.1	20.0	54.3	57.0	226.0	131.7	21.0
23	T-3535	6445	9.5	19.0	52.3	55.0	234.3	145.0	19.3
33	TS-519	6360	9.5	18.7	54.0	56.7	240.0	139.3	24.3
46	HP-720	6281	8.3	24.7	51.0	53.0	221.7	95.3	24.3
49	AS-9082	6123	11.9	20.0	54.3	56.3	216.0	124.3	17.7
20	HT-622	6087	9.3	21.7	54.3	55.7	226.7	123.0	16.7
72	SB-5131	6039	7.6	18.7	54.0	56.0	216.7	124.3	17.7
94	SY-1122	6031	9.9	20.0	51.7	55.0	227.0	124.3	20.7
38	30W64	6008	12.6	17.0	52.0	55.0	226.7	115.0	13.7
14	GT-029	6007	19.9	22.3	54.7	56.3	205.0	110.0	23.3
63	FF-2626 Y	5922	12.4	20.0	54.0	56.0	234.3	125.0	20.7
11	H-636	5900	12.1	25.3	52.0	54.7	221.0	125.7	26.3
42	NSS-439	5815	7.7	18.7	51.7	54.7	212.0	102.3	20.3
54	RB-9780	5793	20.2	13.7	53.0	55.0	211.7	117.3	15.7
64	NSS-929	5707	10.2	16.7	51.0	52.7	241.0	131.0	17.0
112	BURRAQ	5440	11.2	15.7	52.7	54.0	206.7	95.0	14.7
83	GT-822	5429	14.5	20.0	58.7	61.0	195.0	101.0	18.0
90	RS-6721	5331	13.4	16.7	53.3	56.7	208.3	113.3	17.3
84	RA-6440	5269	11.9	19.0	56.7	59.0	201.7	109.7	19.0
53	BF-9292	5157	21.8	19.0	54.0	56.0	228.3	127.7	18.3
115	AS-926	5124	8.4	13.7	53.0	55.0	224.3	132.3	14.0
45	AS-2288	4772	8.4	14.0	55.0	57.0	214.0	121.0	14.7
32	GT-709	4116	9.9	9.7	58.0	60.7	202.7	117.7	9.0

102	NK-7884	3505	5.1	11.3	53.0	55.0	221.0	103.0	12.0
117	YH-5427(CHECK)	3485	6.8	10.7	51.3	54.0	181.3	100.3	13.7
59	RB-1313	2535	4.8	6.7	54.0	56.3	175.0	85.0	6.3
70	AS-6263	2517	1.2	6.0	36.7	58.0	156.3	92.0	6.0
16	31C21	1614	0.3	3.7	49.3	51.0	158.7	92.3	2.7
7	33A22	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	LS-3550	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109	J-451	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CD (LSD)		**20.9**	**10.0**	**11.0**	**3.3**	**3.6**	**6.91**	**21.56**	**4.7**
CV%		**3284**	**6.7**	**6.7**	**2.7**	**2.9**	**19.8**	**15.6**	**NS**

It is evident from the results presented in the above table that significant differences were found among one hundred hybrids for all studied characters. Entry No. 18 remained at top position by giving grain yield 12502 kg/ha followed by Entries No. 10 & 103 gave the yield 11969 kg/ha &11698 kg/ha respectively. Entry No. 91 seemed to be early maturing by taking 50.7 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid. Entry no. 31 showed maximum plant height (275 cm) while entry no.70 showed minimum plant height (156 cm). Entry No. 59 showed lowest cob bearing (85 cm) while Entry No. 93 showed highest cob bearing (165 cm).

SPRING 2021
Germplasm Maintenance

1 Maintenance of Elite Inbred Lines

Three Hundred fifty (350) elite inbred lines were sown ear to row for maintenance during spring-2020 on 15-02-2021**.** The material was sown in such a way that after every two lines, one line was kept fallow to reduce the chance of foreign pollen contamination during hand pollination and to facilitate the breeding work. All these lines were maintained by self-pollination and harvested to retain their purification considering their true to type behavior and other desirable parameters. Number of days to 50% tasseling and silking was recorded to maintain inbred classes based on maturity. After gaining maturity, these self-pollinated lines were harvested and stored for using in next season.

2 Maintenance of Pre Elite Inbred Lines/Families

Thirty one (31) pre-elite lines were sown ear to row during spring-2021 for maintenance and purification of inbred lines through hand pollination. After gaining maturity, these self-pollinated lines were harvested and stored for using in next season.

3 Germplasm Development

3.1 Derivation of Inbred Families

Three Hundred eleven (311) derivatives including dent and flint derivatives were sown ear to row during spring-2021 for inbreeding through hand pollination. Plants selected on the basis of desirable traits like erect to semi erect leaves, medium to heavy tassel, cob length, lower cob placement, strong root anchor and disease tolerance were self-pollinated in all the families. After gaining maturity, these self-pollinated lines were harvested and stored for using in next season for generation advancement.

4 Germplasm Enhancement

4.1 Screening of Maize Germplasm and Hybrids Tolerant to Stalk Rot

Selfed-plants of four hundred fifty (450) elite inbred lines, Thirty one (31) pre-elite lines and Three Hundred eleven (311) derivatives were inoculated with stalk rot fungus carrier toothpicks at second node from the base. At harvesting stems of self-plants were torn apart with the help of scalpel to see the penetration of pathogen below or above the point of insertion of tooth picks. The scoring for tolerant to susceptible was made on the basis of Hooker's Scale. The plants showing no infection and infection within node was selected as tolerant and moderate tolerant lines respectively. In case of infection reached to the second internode, the plant was declared susceptible and rejected from the line in the field.

All the hybrids sown in PYT& MPMYT were also inoculated with stalk rot fungus carrier toothpicks at second node from the base. The selection procedure was the same as described in above paragraph. Data were collected at the time of harvesting to know the susceptibility of hybrids against stalk rot.

5 Hybrid Constitution/Development of New Single Crosses in Isolation Blocks

5.1 Isolation No.1

Fifty-nine (59) elite inbred lines were used as female with NUMYT Kh.11-6 as male were sown on 10-2-2021 for production of new single crosses. The female lines were de-tasseled prior to the dehiscence of pollen. These crosses will be tested in preliminary yield trials & NUMYT in kharif-2021. The best performing single crosses will be selected.

5.2 Isolation No.2

Fifty-nine (59) elite inbred lines were used as female with P-222 as male were sown on 10-2-2021 for production of new single crosses. The female lines were de-tasseled prior to the dehiscence of pollen. These crosses will be tested in preliminary yield trials & NUMYT in kharif-2021. The best performing single crosses will be selected.

5.3 Isolation No.3

Fifty three (53) elite inbred lines were used as female with Y-36 as male were sown on 18-02-2021 for production of new single crosses. The female lines were de-tasseled prior to the dehiscence of pollen. These crosses will be tested in preliminary yield trials, NUMYT and on farm trial in kharif-2021. The best performing single crosses will be selected.

5.4 Isolation No.4

Fifty nine (59) elite inbred lines were used as female with Y-27 as male were sown on 12-2-2021 for production of new single crosses. The female lines were de-tasseled prior to the dehiscence of pollen. These crosses will be tested in preliminary yield trials& NUMYT in kharif-2021. The best performing single crosses will be selected.

6. Hybrid Evaluation
Replicated Yield Trials

6.1 Preliminary Maize Hybrid Yield Trial No. 1 Spring-2021

This trial was comprised of Twenty (20) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 9: Results of Preliminary Maize Hybrid Yield Trial No. 1 Spring-2021 (Y-27 as male)

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
12	YH-5960	10577a	120	63.5	65.5	**217.5**	**120**	32
4	YH-5952	9837ab	102.5	63	65	187.5	102.5	31
5	YH-5953	9056abc	102.5	63	65.5	197.5	102.5	30
10	YH-5958	8854abc	110	66.5	68.5	212.5	110	31.5
18	YH-5427	8783abc	107.5	66.5	68.5	192.5	107.5	29
14	YH-5962	8651abcd	102.5	65	67	190	102.5	32
7	YH-5955	8621abcd	117.5	63.5	65.5	210	117.5	40.5
6	YH-5954	8362abcd	117.5	64.5	66.5	210	117.5	31
17	YH-5482	8034abcde	102.5	64.5	66.5	180	102.5	26
11	YH-5959	7827abcde	107.5	64.5	67	197.5	107.5	34
13	YH-5961	7782abcde	115	67	69	210	115	31
8	YH-5956	7697abcde	100	65.5	67.5	187.5	100	30
19	YH-1898	7678abcde	105	64.5	66.5	180	105	29.5
20	P-1429	7644abcde	100	63	65.5	**217.5**	100	27
9	YH-5957	7533abcde	105	66	68	192.5	105	30
16	YH-5964	7470abcde	105	64.5	66.5	175	105	37.5
15	YH-5963	7324bcde	97.5	63	65	182.5	97.5	25
3	YH-5951	5986cde	110	62.5	**64.5**	170	110	38
2	YH-5950	5581de	102.5	67	**69.5**	175	102.5	32.5
1	YH-5949	5066e	85	63	65	**150**	**85**	31
CV %		18.86	10.45	3.73	3.79	6.68	10.45	12.61
LSD (5 %)		3126.1	23.141	5.0	5.0	26.799	23.141	8.2929

The result in Table above revealed that significant differences were found among all hybrids for all characters in preliminary maize hybrid yield trial (PYT-1). It is evident from the results that YH-5960 gave maximum yield (10577kg/ha) followed by YH-5952(9837 kg/ha). YH-5951 seemed to be early maturing by taking 65 days to complete its fifty percent silks while YH-5950 was late maturing taking 70 days to silks. YH-5960 and P-1429 showed maximum plant height (217.5 cm) and cob height (120 cm). While, YH-5949 showed minimum plant height (150 cm) and low cob bearing (85cm)

6.2 Preliminary Maize Hybrid Yield Trial No. 2 Spring-2021

This trial was comprised of Twenty (20) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 10: Results of Preliminary Maize Hybrid Yield Trial No. 2 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cobs Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
3	YH-5967	**11070a**	39	62.5	**64.5**	202.5	97.5	31.5
14	YH-5978	10027ab	36.5	65	67	200	112.5	40
20	DK-6724	9827ab	36.5	63	65.5	**222.5**	107.5	36.5
15	YH-5979	9769ab	36	63	65	205	125	36
17	YH-5482	9607ab	39	64.5	66.5	205	110	34
8	YH-5972	9602abc	40	65.5	67.5	195	115	36
16	YH-5980	9399abc	40	64.5	66.5	180	105	44.5
10	YH-5974	9201abc	36.5	66.5	68.5	215	125	38.5
18	YH-5427	9200abc	38.5	66.5	68.5	192.5	**62.5**	38
6	YH-5970	9135abc	35.5	64.5	66.5	160	85	36
4	YH-5968	8883abc	32.5	63	65	190	112.5	29.5
19	YH-1898	8813abcd	40.5	64.5	66.5	200	125	35
13	YH-5977	8807abcd	27	67	69	200	120	28
12	YH-5976	8692bcd	35	63.5	65.5	200	120	34
2	YH-5966	8360bcde	33.5	67	**69.5**	**172.5**	95	28.5
5	YH-5969	7974bcdef	30	63	65.5	185	112.5	29.5
9	YH-5973	7275cdef	29.5	66	68	202.5	115	30.5
7	YH-5971	6699def	26	63.5	65.5	217.5	**137.5**	30.5
1	YH-5965	6322ef	27.5	63	65	177.5	95	29.5
11	YH-5975	5968f	18.5	64.5	67	212.5	122.5	19
CV %		12.77		15.54	3.79	4.88	18.58	18.45
LSD (5 %)		2333.6		11.02	5.29	20.10	42.80	12.84

The result in Table above unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (PYT-2). It is evident from the results that YH-5967 gave maximum yield (11070 kg/ha) followed by YH-5978 (10027 kg/ha). YH-5967seemed to be early maturing by taking 64.4 days to complete its fifty percent silks while YH-5966 was late maturing taking 69.5 days to silks. DK-6724 showed maximum plant height (222.5 cm) while YH-5966showed minimum plant height (172.5 cm). YH-5427showed low cob bearing (62.5 cm) while YH-5971showed high cob bearing (137.5 cm).

6.3 Preliminary Maize Hybrid Yield Trial No. 3 Spring-2021(DR-37 as male)

This trial was comprised of Thirty six (36) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 11: Results of Preliminary Maize Hybrid Yield Trial No. 3 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
21	YH-6069	9240a	36.5	64.5	66.5	192.5	97.5	27.5
35	P-1429	8900a	35.5	66.5	68.5	195	95	34.5
5	YH-6053	8824ab	29	62.5	65	197.5	100	31
29	YH-6076	8586abc	28	64	66	197.5	107.5	33
10	YH-6058	8541abc	31	66	68	202.5	**117.5**	27.5
7	YH-6055	8365abcd	31.5	62.5	**64.0**	200	102.5	35
36	DK-6724	8345abcd	36.5	62.5	64.5	192.5	95	38.5
4	YH-6052	8139abcd	30.5	63.5	65.5	202.5	**117.5**	28.5
16	YH-6064	8099abcde	36	62.5	64.5	180	**80**	36
3	YH-6051	7999abcdef	28.5	63.5	65.5	192.5	97.5	26.5
25	YH-6072	7995abcdef	33.5	62.5	64.5	192.5	102.5	38.5
27	YH-6074	7885abcdef	29.5	64	66	205	112.5	27.5
15	YH-6063	7836abcdef	33	66	68	192.5	90	30
20	YH-6068	7820abcdef	27	67	70	190	107.5	30
11	YH-6059	7768abcdef	30.5	64	66.5	202.5	102.5	30
19	YH-6067	7715abcdef	34	65.5	67.5	182.5	100	35
30	YH-6077	7565abcdefg	31	67.5	69.5	190	100	37
32	YH-5482	7555abcdefg	34	64	66.5	182.5	102.5	35
26	YH-6073	7408abcdefg	33.5	65	67	**207.5**	115	33
2	YH-6050	7404abcdefg	29.5	65	67	180	97.5	31.5
6	YH-6054	7346abcdefg	32.5	65	67	202.5	110	36
24	YH-6071	7335abcdefg	27	64.5	66.5	205	107.5	26.5
22	YH-6070	7284abcdefg	30	65	67	180	92.5	35
28	YH-6075	7258abcdefg	25.5	66	68	197.5	100	25.5
13	YH-6061	7219abcdefg	31	67.5	70	190	100	29.5
18	YH-6066	7119abcdefg	36	63.5	65.5	172.5	90	31.5
1	YH-6049	6989bcdefgh	27.5	63	65	182.5	100	29.5
8	YH-6056	6985bcdefgh	25	62.5	64.5	197.5	102.5	24
23	YH-6070-1	6781bcdefgh	28.5	63.5	65.5	197.5	110	27.5
31	YH-6078	6584cdefgh	29	64.5	66.5	190	105	32
12	YH-6060	6377cdefgh	27	65.5	67.5	197.5	105	23.5
33	YH-5427	6348defgh	31	66.5	**69**	165	95	29
14	YH-6062	6329efgh	38	64	66	172.5	90	40
34	YH-1898	6260fgh	33.5	64	66	**160**	87.5	34.5
17	YH-6065	5896gh	23	64.5	66.5	185	97.5	31
9	YH-6057	5837h	20.5	64	66	192.5	102.5	19.5
CV %		**16.12**		**14.56**	**2.79**	**5.73**	**10.01**	**17.57**
LSD (5 %)		**2524**		**9.2873**	**3.8**	**22.2**	**20.9**	**11.4**

The result in Table unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (PYT-03). It is evident from the results that YH-6069gave maximum yield (9240 kg/ha) followed by P-1429(8900 kg/ha). YH-6055 seemed to be early maturing by taking 64 days to complete its fifty percent silks while YH-5427was late maturing taking 69 days to silks. YH-6073 showed maximum plant height (207.5 cm) while YH-1898showed minimum plant height (160 cm). YH-6064showed low cob bearing (80 cm) while YH-6058showed high cob bearing (117.5 cm).

6.4 Preliminary Maize Hybrid Yield Trial No. 4 Spring-2021

This trial was comprised of Twenty (20) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 12: Results of Preliminary Maize Hybrid Yield Trial No. 4 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
19	P-1429	**10682a**	30	64.5	66.5	215	100	25.5
20	DK-6724	10015ab	37.5	63	65.5	217.5	97.5	34.5
11	YH-6024	9777abc	38.5	64.5	67	**222.5**	117.5	36
16	YH-5428	9762abc	32.5	64.5	66.5	205	110	34.5
14	YH-6027	9591abcd	34.5	65	67	205	112.5	33
17	YH-5427	9560abcd	35	64.5	66.5	190	112.5	35
18	YH-1898	9531abcd	37.5	66.5	68.5	197.5	107.5	42.5
6	YH-6018	9156abcde	31.5	64.5	66.5	197.5	102.5	30
13	YH-6026	8924abcdef	31	67	**69**	197.5	97.5	30.5
15	YH-6028	8883abcdef	32.5	63	65	185	100	33.5
1	YH-6013	8223abcdef	31.5	63	65	195	105	35.5
5	YH-6017	8213abcdef	29.5	63	65.5	200	92.5	30.5
7	YH-6020	8199abcdef	33	63.5	65.5	190	92.5	28
8	YH-6021	8130abcdef	30	65.5	67.5	**185**	**92.5**	27
9	YH-6022	7394bcdefg	22	66	68	212.5	105	24.5
12	YH-6025	7295cdefg	26.5	63.5	65.5	215	105	21
10	YH-6023	6984defg	23.5	66.5	68.5	200	97.5	21.5
2	YH-6014	6823efg	23.5	67	69.5	200	110	25
4	YH-6016	6408fg	26	63	65	187.5	**147.5**	20
3	YH-6015	5361g	22.5	62.5	**64.5**	187.5	112.5	18.5
CV %		**15.00**	**18.05**	**3.73**	**3.79**	**6.2**	**13.72**	**24.9**
LSD (5 %)		**2664.2**	**11.497**	**5.0**	**5.3**	**25.98**	**30.414**	**15.3**

The result in Table 04 unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (PYT-04). It is evident from the results that commercial hybrid P-1429gave maximum yield (10682 kg/ha) followed by another commercial hybrid DK-6724(10015 kg/ha). YH-6015 seemed to be early maturing by taking 64.5 days to complete its fifty

percent silks while YH-6026 was late maturing taking 69 days to silks. YH-6024 showed maximum plant height (222.5 cm) while YH-6021showed minimum plant height (185 cm). YH-6021showed low cob bearing (92.5 cm) while YH-6016showed high cob bearing (147.5 cm).

6.5 Preliminary Maize Hybrid Yield Trial No. 5 Spring-2021

This trial was comprised of Twenty (20) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 13: Results of Preliminary Maize Hybrid Yield Trial No. 5 Spring-2021 (P-222 as male)

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
4	YH-6032	10132a	34	63	65	190	100	33.5
19	P-1429	9845ab	27.5	64.5	66.5	207.5	**85**	30
5	YH-6033	9798ab	33	63	65.5	192.5	107.5	31.5
20	DK-6724	9339abc	33	63	65.5	210	95	31.5
3	YH-6031	9123abcd	29	62.5	**64.5**	210	92.5	32
14	YH-6043	8164abcde	26.5	65	67	207.5	112.5	20
8	YH-6037	8096abcde	23	65.5	67.5	**215**	**122.5**	20.5
1	YH-6029	8048abcde	23.5	63	65	187.5	97.5	25.5
10	YH-6039	7975bcde	22	66.5	68.5	200	102.5	23
6	YH-6034	7610cdef	25	64.5	66.5	197.5	95	20
9	YH-6038	7459cdef	22	66	68	210	115	21.5
17	YH-5427	7439cdef	25	64.5	66.5	177.5	95	25.5
16	YH-5482	7430cdef	21	64.5	66.5	205	110	27
11	YH-6040	7321cdef	19	64.5	67	197.5	115	18.5
18	YH-1898	7240def	29.5	66.5	68.5	**170**	100	31.5
15	YH-6044	7013ef	21.5	63	65	187.5	95	21.5
12	YH-6041	6848ef	19.5	63.5	65.5	197.5	117.5	18
13	YH-6042	6655efg	27	67	69	182.5	87.5	25.5
2	YH-6030	5688fg	19.5	67	**69.5**	187.5	107.5	22
7	YH-6036	4598g	19	63.5	65.5	**170**	97.5	17
CV %		**12.85**	**17.3**	**3.73**	**3.79**	**4.3**	**7.37**	**21.94**
LSD (5 %)		**2095.1**	**9.04**	**5.0332**	**5.2879**	**17.557**	**15.817**	**11.376**

The result in Table unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (PYT- 5). It is evident from the results that YH-6032gave maximum yield (10132 kg/ha) followed by P-1429(9845 kg/ha). YH-6031seemed to be early maturing by taking 65 days to complete its fifty percent silks while YH-6030 was late maturing taking 70 days to silks. YH-6037 showed maximum plant height (215 cm) while YH-6036showed minimum plant height (170 cm). P-1429showed low cob bearing (85 cm) while YH-6037showed high cob bearing (122.5 cm).

6.6 Preliminary Maize Hybrid Yield Trial No. 6 Spring-2021

This trial was comprised of Twenty (20) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 14: Results of Preliminary Maize Hybrid Yield Trial No. 6 Spring-2021 (Y-36 as male)

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
10	YH-5992	9613a	30.5	66.5	68.5	227.5	**125**	32.5
9	YH-5991	9455ab	36	66	68	200	105	35
11	YH-5993	9429ab	28.5	64.5	67	**230**	**125**	29.5
17	YH-6000	9276abc	25	64.5	66.5	**182.5**	**85**	28
16	YH-5999	8992abc	30	65	67	217.5	112.5	30
18	YH-5482	8891abc	25.5	66.5	68.5	190	95	30
12	YH-5994	8787abc	34	63.5	65.5	187.5	120	32
4	YH-5986	8214abc	29.5	63	65	192.5	97.5	29.5
3	YH-5985	8125abc	32	62.5	**64.5**	187.5	95	31
19	YH-5427	8078abc	25	64.5	66.5	187.5	102.5	30.5
13	YH-5995	7677abc	27.5	67	69	195	100	26.5
14	YH-5996	7670abc	30	65	67	192.5	90	32
5	YH-5987	7645abc	22.5	63	65.5	192.5	112.5	24
20	DK-6724	7430abc	25	63	65.5	197.5	90	23
15	YH-5998	7258abc	25.5	63	65	**182.5**	90	25
2	YH-5984	7176abc	24.5	67	**69.5**	200	117.5	28
6	YH-5988	7136abc	22	64.5	66.5	187.5	97.5	25.5
8	YH-5990	6946bc	25	65.5	67.5	200	105	22.5
1	YH-5983	6891bc	27	63	65	190	105	28.5
7	YH-5989	6737c	26.5	63.5	65.5	190	105	32
CV %		**15.51**	**20.82**	**3.7**	**3.77**	**7.53**	**11.6**	**16.92**
LSD (5 %)		**2620.9**	**12.017**	**5.00**	**5.2578**	**30.97**	**25.192**	**10.181**

The result in Table unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (PYT-6). It is evident from the results that YH-5992 gave maximum yield (9613 kg/ha) followed by YH-5991(9455 kg/ha). YH-5985 seemed to be early maturing by taking 65 days to complete its fifty percent silks while YH-5984 was late maturing taking 70 days to silks. YH-5993 showed maximum plant height (200 cm) while YH-6000 & YH-5998showed minimum plant height (182.5 cm). YH-6000showed low cob bearing (85 cm) while YH-5953showed high cob bearing (125 cm).

6.7 Preliminary Maize Hybrid Yield Trial No. 7 Spring-2021

This trial was comprised of Twenty (20) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 15: Results of Preliminary Maize Hybrid Yield Trial No. 7 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
20	P-1429	**10357a**	35	63	65.5	197.5	105	40
11	YH-6011	9832ab	26.5	64.5	67	212.5	110	32
13	YH-6045	9622abc	28	67	69	**237.5**	**137.5**	31
18	YH-5427	8977abcd	32	66.5	68.5	175	100	37
17	YH-5482	8661abcd	29.5	64.5	66.5	177.5	100	31
4	YH-6004	8628abcd	30	63	65	207.5	112.5	33.5
10	YH-6010	8489abcd	25	66.5	68.5	220	117.5	25.5
9	YH-6009	8177bcd	27	66	68	190	105	24.5
15	YH-6047	8147bcd	26.5	63	65	200	107.5	25
12	YH-6012	8108bcd	24	63.5	65.5	190	110	33
2	YH-6002	7833bcde	26	67	**69.5**	167.5	**85**	26
1	YH-6001	7724bcde	27	63	65	195	107.5	30
14	YH-6046	7465cde	27	65	67	**112.5**	125	28
5	YH-6005	7356de	24.5	63	65.5	205	115	24.5
7	YH-6007	7204de	22.5	63.5	65.5	197.5	107.5	21
6	YH-6006	6906de	27.5	64.5	66.5	207.5	112.5	30.5
3	YH-6003	5812ef	18	62.5	**64.5**	177.5	95	18.5
8	YH-6008	5692ef	19	65.5	67.5	190	100	28.5
19	YH-1898	5654ef	17	64.5	66.5	185	115	23.5
16	YH-6048	4434f	23.5	64.5	66.5	167.5	95	28.5
CV %		**13.43**	**18.68**	**3.73**	**3.79**	**15.87**	**8.17**	**18.46**
LSD (5 %)		**2179.9**	**10.1**	**5.0332**	**5.2879**	**63.333**	**18.484**	**11.043**

The result unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (PYT-7). It is evident from the results that P-1429gave maximum yield (10357 kg/ha) followed by YH-6011 (9832 kg/ha). YH-6003 seemed to be early maturing by taking 65 days to complete its fifty percent silks while YH-6002 was late maturing taking 70 days to silks. YH-6045 showed maximum plant height (237.5cm) while YH-6046showed minimum plant height (112.5 cm). YH-6002showed low cob bearing (85 cm) while YH-6045showed high cob bearing (137.5 cm).

6.8 Micro plot Hybrid Maize Yield Trial No. 1 Spring-2021

This trial was comprised of thirty-six (36) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 16: Results of Micro plot Hybrid Maize Yield Trial No. 1 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
10	YH-5850	6714a	29	65.5	67.5	177.5	90	31
25	YH-5855	6708ab	26	62	64	202.5	110	30
11	YH-5750	6650abc	30.5	63	65.5	190	102.5	34
12	YH-5632-1	6214abc	25.5	66	68	197.5	95	30
14	YH-5632-3	5826abcd	25	64.5	66.5	200	90	30.5
29	YH-5857	5741abcd	26.5	64	66	177.5	87.5	29
19	YH-5851	5691abcde	31	64.5	66.5	195	110	35
20	YH-5852	5641abcde	25	64.5	67	172.5	90	26
13	YH-5632-2	5547abcde	23.5	63	65	200	102.5	31
24	YH-5762	5437abcde	24.5	62	64	187.5	102.5	28.5
16	YH-5755	5419abcde	23.5	63.5	65.5	192.5	100	29.5
17	YH-5756	5414abcde	25.5	65	67	**217.5**	**122.5**	29.5
18	YH-5758	5210abcde	31.5	64.5	66.5	**217.5**	**122.5**	35
22	YH-5854	5054abcde	31	66	68	185	82.5	34
7	YH-5849	4988abcde	24	66	68	172.5	85	25
30	YH-5766	4868abcde	20.5	68	**70**	197.5	95	25
5	YH-5847	4867abcde	34.5	66.5	69.5	187.5	87.5	42
36	DK-6724	4849abcde	30.5	66	68	195	95	42.5
15	YH-5669	4837abcde	26.5	63	65	185	110	35
9	YH-5883-2	4785abcde	24.5	63	65	185	90	26
8	YH-5683-1	4741abcde	23.5	61.5	**63.5**	182.5	85	31.5
35	P-1429	4609bcde	28.5	65.5	67.5	197.5	87.5	39
23	YH-5761-2	4524bcde	21.5	63.5	65.5	205	112.5	25.5
26	YH-5511	4470bcde	23.5	64	66	195	115	29.5
28	YH-5732	4403bcde	22	64	66	187.5	85	28.5
3	YH-5845	4358bcde	28.5	62	64	192.5	92.5	39.5
27	YH-5856	3964bcde	21	65	67	190	97.5	26
21	YH-5853	3953bcde	21.5	64.5	66.5	195	105	31.5
31	YH-5776	3927bcde	22	63.5	65.5	167.5	85	29.5
33	YH-5427	3680bcde	23	66.5	69	172.5	87.5	37.5
1	YH-5843	3513cde	27	62	64	177.5	80	33
2	YH-5844	3298cde	18	66	68	195	95	27.5
32	YH-5482	3206cde	22	64.5	66.5	187.5	105	37.5
4	YH-5846	3140de	24	66.5	68.5	172.5	82.5	33.5
34	YH-1898	3022de	24	63.5	65.5	175	80	41
6	YH-5749	2255e	18	63	65	**160**	**72.5**	29.5
CV %		**29.50**	**17.88**	**3.09**	**3.15**	**9.77**	**18.44**	**14.59**
LSD (5 %)		**2853.0**	**9.13**	**4.04**	**4.25**	**37.40**	**35.7**	**9.45**

The result unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (MPMYT-1). It is evident from the results that YH-5850gave maximum yield (6714 kg/ha) followed by YH-5855 (6708 kg/ha). YH5683-1 seemed to be early maturing by taking 64 days to complete its fifty percent silks while YH-5766 was late maturing taking 70 days to silks. YH-5756 showed maximum plant height (217.5 cm) while YH-5749showed minimum plant height and cob height (160 cm & 72.5 cm).

6.9 Micro plot Hybrid Maize Yield Trial No. 2 Spring-2021

This trial was comprised of thirty six (36) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 17: Results of Micro plot Hybrid Maize Yield Trial No. 2 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
31	YH-5848	5796a	30	63.5	65.5	190	97.5	34.5
29	YH-5884	5523ab	30	64	66	195	100	35
14	YH-5871	5284ab	24	64.5	66.5	175	80	23
27	YH-5761-1	4990 ab	24	65	67	192.5	95	29.5
35	P-1429	4976 ab	29.5	65.5	67.5	**205**	105	33.5
26	YH-5883	4904 ab	26	64	66	180	95	27.5
5	YH-5862	4865 ab	32.5	66.5	69.5	192.5	**47**	35.5
12	YH-5869	4765 ab	31	66	68	160	72.5	41
25	YH-5882	4732 ab	23	62	**64**	185	**112.5**	23
33	YH-5427	4674abc	25	66.5	**69**	170	87.5	38.5
1	YH-5777	4580abc	29.5	62	64	190	110	34.5
10	YH-5867	4404abcd	31.5	65.5	67.5	172.5	80	35.5
11	YH-5868	4374abcd	30	63	65.5	172.5	102.5	38
7	YH-5864	4370abcd	24	66	68	167.5	77.5	30
19	YH-5876	4323abcd	22	64.5	66.5	185	85	32
9	YH-5866	4320abcd	23.5	63	65	165	80.5	40
2	YH-5859	4229abcde	20.5	66	68	180	100	32
15	YH-5872	3922abcdef	25.5	63	65	182.5	100	36.5
30	YH-5885	3921abcdefg	22.5	68	70	190	102.5	36
32	YH-5482	3900abcdefg	21	64.5	66.5	195	105	35
36	Dk-6724	3889abcdefgh	22.5	66	68	172.5	77.5	37
28	YH-5764	3864abcdefgh	23.5	64	66	182.5	97.5	35.5
3	YH-5860	3836abcdefgh	23.5	62	64	160	85	32.5
22	YH-5879	3694abcdefgh	19	66	68	**150**	60	24
20	YH-5877	3643abcdefgh	20.5	64.5	67	175	82.5	31.5
4	YH-5861	3609abcdefgh	17	66.5	68.5	182.5	105	21.5
6	YH-5863	3581abcdefgh	19	63	65	172.5	90	28.5

8	YH-5865	3559bcdefgh	24.5	61.5	63.5	157.5	72.5	34
23	YH-5880	3397bcdefgh	17	63.5	65.5	170	75	26.5
13	YH-5870	3186cdefgh	16.5	63	65	190	100	27.5
18	YH-5875	3051cdefgh	19.5	64.5	66.5	162.5	85	28
34	YH-1898	2987defgh	19	63.5	65.5	155	85	36.5
17	YH-5874	2859efgh	15	65	67	170	90	21
16	YH-5872	2802fgh	20	63.5	65.5	177.5	97.5	25.5
21	YH-5878	2665gh	12	64.5	66.5	155	67.5	13.5
24	YH-5881	2393h	18.5	62	64	152.5	80	23
CV %		**28.02**	**24.47**	**4.00**	**4.07**	**8.71**	**18.43**	**14.01**
LSD (5 %)		**2304.8**	**11.48**	**5.22**	**5.48**	**31.09**	**33.11**	**8.81**

The result unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (MPMYT-2). It is evident from the results that YH-5848gave maximum yield (5796 kg/ha) followed by YH-5884 (5523 kg/ha). YH5882 seemed to be early maturing by taking 64 days to complete its fifty percent silks while YH-5427 was late maturing taking 69 days to silks. P-1429 showed maximum plant height (205 cm) while YH-5879showed minimum plant height (150 cm). YH-5862showed low cob bearing (47 cm) while YH-5882showed high cob bearing (112.5 cm).

7. Micro plot Hybrid Maize Yield Trial No. 3 Spring-2021

This trial was comprised of thirty six (36) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 18: Results of Micro plot Hybrid Maize Yield Trial No. 3 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
22	YH-5907	5721a	25.5	66	68	165	75	36
11	YH-5896	5512ab	25	63	65.5	167.5	**53**	32.5
12	YH-5897	5452abc	23	66	68	167.5	90	31
23	YH-5908	5161abcd	29	63.5	65.5	165	87.5	33.5
2	YH-5887	4914abcd	22.5	66	68	167.5	70	28
20	YH-5905	4870abcd	24.5	64.5	67	165	85	29
25	YH-5910	4867abcde	27	62	64	172.5	92.5	40
17	YH-5902	4851abcdef	22.5	65	67	177.5	92.5	31
3	YH-5888	4749abcdef	24	62	64	170	72.5	32
13	YH-5898	4685abcdefg	22	63	65	177.5	74	30
30	YH-5915	4676abcdefg	22.5	68	**70**	162.5	70	31
8	YH-5893	4574abcdefg	22	61.5	**63.5**	155	82.5	30.5
26	YH-5911	4484bcdefgh	22.5	64	66	160	80	31.5
27	YH-5912	4273bcdefgh	22.5	65	67	165	85	27
6	YH-5891	4253cdefghi	21.5	63	65	150	77.5	31
1	YH-5886	4061cdefghij	21.5	62	64	160	85	30.5

24	YH-5909	4031defghijk	20	62	64	150	82.5	27
10	YH-5895	3910defghijk	20.5	65.5	67.5	155	75	27
7	YH-5892	3791defghijkl	21.5	66	68	170	87.5	23.5
4	YH-5889	3757efghijklm	22.5	66.5	68.5	155	75	32
32	YH-5482	3703efghijklm	25	64.5	66.5	155	75	36.5
18	YH-5903	3663efghijklmn	24.5	64.5	66.5	162.5	85	31.5
35	P-1429	3659efghijklmn	22	65.5	67.5	172.5	82.5	27
9	YH-5894	3587fghijklmn	16.5	63	65	162.5	80	22
31	YH-5916	3459ghijklmno	24.5	63.5	65.5	142.5	70	30
36	Dk-6724	3403hijklmnop	18	66	68	167.5	90	29
5	YH-5890	3239ijklmnop	21	66.5	69.5	170	90	33
21	YH-5906	3198ijklmnop	24.5	64.5	66.5	175	92.5	34
33	YH-5427	3089ijklmnop	17	66.5	69	160	85	36.5
16	YH-5901	2939jklmnop	19.5	63.5	65.5	155	87.5	31
34	YH-1898	2908klmnop	16	63.5	65.5	167.5	80	40.5
19	YH-5904	2861lmnop	17.5	64.5	66.5	**185**	**102.5**	25.5
14	YH-5899	2818mnop	16.5	64.5	66.5	162.5	77.5	27
29	YH-5914	2352nop	17.5	64	66	160	77.5	25.5
15	YH-5900	2314op	11	63	65	152.5	85	26
28	YH-5913	1205p	11	64	66	**125**	70	38
CV %		**23.34**	**19.43**	**4.00**	**4.07**	**8.89**	**7.89**	**16.80**
LSD (5 %)		**1856.1**	**8.37**	**5.22**	**5.48**	**29.34**	**27.34**	**10.48**

The result unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (MPMYT-3). It is evident from the results that YH-5907gave maximum yield (5721 kg/ha) followed by YH-5896 (5512 kg/ha). YH-5893 seemed to be early maturing by taking 64 days to complete its fifty percent silks while YH-5915 was late maturing taking 70 days to silks. YH-5904 showed maximum plant height (185 cm) while YH-5913showed minimum plant height (125 cm). YH-5896 showed low cob bearing (53 cm) while YH-5904showed high cob bearing (102.5 cm).

7.1 Micro plot Hybrid Maize Yield Trial No. 4 Spring-2021

This trial was comprised of thirty six (36) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 2. The data regarding various parameters are presented in the following table.

Table 19: Results of Micro plot Hybrid Maize Yield Trial No. 4 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
28	YH-5944	7694a	31.5	63.5	66	185	95	35
27	YH-5943	7152ab	32.5	65.5	68	**190**	97.5	29.5
29	YH-5945	6570abc	27.5	62.5	65	182.5	**107.5**	34
22	YH-5938	6305abcd	26.5	64.5	67	170	95	24.5

24	YH-5940	5868abcde	24.5	61	**63.5**	172.5	92.5	28
30	YH-5946	5775abcdef	27.5	64.5	67	180	102.5	24
26	YH-5942	4763abcdef	24.5	62.5	65	150	85	29.5
18	YH-5934	4756bcdef	23	63.5	66	155	77.5	27
23	YH-5939	4722bcdefg	22.5	62.5	65	175	100	28.5
2	YH-5918	4694bcdefg	17.5	66	68	170	90	24
10	YH-5926	4657bcdefg	23	65.5	67.5	162.5	90	33.5
11	YH-5927	4509cdefgh	25.5	63	65.5	167.5	100	34.5
25	YH-5941	4372cdefghi	21.5	62.5	65	155	75	22.5
31	YH-5482	4257defghij	20.5	63	65.5	157.5	85	26.5
3	YH-5919	4204defghij	24.5	62	64	150	75	26.5
9	YH-5925	4074defghijk	16.5	63	65	175	95	16
16	YH-5932	3956defghijk	23	63.5	65.5	157.5	85	25
7	YH-5923	3723defghijk	18.5	66	68	152.5	85	25
13	YH-5929	3497efghijk	13.5	63	65	182.5	100	14.5
12	YH-5928	3333efghijk	18	66	68	162.5	90	27
36	NK-8441	3243efghijkl	17	62	64.5	155	75	31.5
5	YH-5921	3196efghijkl	12	66.5	**69.5**	152.5	70	33
21	YH-5937	3159efghijkl	15	64	66.5	152.5	82.5	15.5
6	YH-5922	3037fghijkl	14.5	63	65	150	72.5	17
34	P-1429	2918fghijklm	12.5	63	65.5	185	97.5	26.5
20	YH-5936	2764fghijklm	14	65	67.5	150	92.5	15
1	YH-5917	2744fghijklm	16.5	62	64	162.5	87.5	35.5
17	YH-5933	2273ghijklm	13	64	66.5	165	85	18
14	YH-5930	2226ghijklm	16	64.5	66.5	150	65	17.5
33	YH-1898	2155hijklm	9	62	64.5	**125**	**60**	35
35	Dk-6724	2029ijklm	10.5	62.5	65	135	75	26
8	YH-5924	1892jklm	14.5	61.5	63.5	165	87.5	16
4	YH-5920	1714jklm	17	66.5	68.5	155	92.5	23
15	YH-5931	1398klm	11.5	63	65	167.5	75	27
32	YH-5427	1000lm	9	63	65.5	150	72.5	26.5
19	YH-5935	877lm	6.5	63.5	66	145	72.5	21
CV %		**36.13**	**31.38**	**3.24**	**3.01**	**8.60**	**14.07**	**16.51**
LSD (5 %)		**2761.2**	**11.86**	**4.18**	**4.02**	**28.21**	**24.47**	**8.55**

The result unveiled that significant differences were found among all hybrid for all characters in preliminary maize hybrid yield trial (MPMYT-4). It is evident from the results that YH-5944gave maximum yield (7694 kg/ha) followed by YH-5943 (7152 kg/ha). YH-5940 seemed to be early maturing by taking 64 days to complete its fifty percent silks while YH-5921 was late maturing taking 70 days to silks. YH-5943 showed maximum plant height (190 cm) while YH-1898showed minimum plant height and cob height 125 cm & 60cm respectively. While YH-5945 showed high cob bearing (107.5 cm).

7.2 Macro plot Hybrid Maize Yield Trial No. 5 Spring-2021

This trial was comprised of twenty six (26) entries including Standard hybrids of different maturity groups and containing temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4m x 0.75m x 1. The data regarding various parameters are presented in the following table.

Table 20: Results of Macro plot Hybrid Maize Yield Trial No. 5 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
25	P-1429	**3350a**	16.0	63.0	65.0	192.5	95.0	13.0
20	YH-5679	2884ab	14.0	64.5	66.5	140.0	70.0	12.0
8	YH-5974	2741abc	14.0	62.0	64.0	145.0	95.0	15.0
26	DK-6724	2616abcd	15.5	63.5	65.5	195.0	107.5	14.5
21	YH-5482	2151bcde	15.0	64.0	66.0	180.0	92.5	13.0
6	YH-5972	2052bcdef	16.0	63.0	65.0	**202.5**	105.0	14.5
24	FH-1046	2029bcdef	12.0	63.0	65.0	172.5	97.5	11.0
15	YH-5949	2014bcdef	13.0	62.5	64.5	147.5	80.0	13.5
22	YH-5427	1800cdefg	14.5	64.5	67.0	**132.5**	67.5	14.5
5	YH-5971	1678defgh	11.5	67.0	**69.5**	190.0	85.0	16.5
3	YH-5969	1667defgh	10.5	61.5	**63.5**	155.0	75.0	16.0
18	YH-5952	1627efgh	8.5	64.0	66.0	175.0	102.5	12.0
1	YH-5967	1240efghi	7.0	65.0	67.0	185.0	**110.0**	11.0
9	YH-5975	1228efghi	9.5	63.5	65.5	155.0	77.5	12.5
17	YH-5951	1173efghi	9.5	64.0	66.0	155.0	87.5	11.5
2	YH-5968	1116fghi	9.5	65.0	67.0	155.0	80.0	12.5
23	YH-1898	1081fghi	10.5	63.5	65.5	162.5	92.5	16.0
13	YH-5979	918ghi	7.0	62.0	64.0	177.5	90.0	15.5
4	YH-5970	900ghi	9.0	67.5	69.5	177.5	87.5	14.7
10	YH-5976	849ghi	10.0	66.0	68.5	165.0	85.0	13.5
11	YH-5977	819ghi	5.5	62.0	64.0	185.0	90.0	12.5
14	YH-5980	737hi	5.5	63.5	65.5	145.0	80.0	13.5
16	YH-5950	706hi	7.0	65.5	67.5	145.0	82.5	14.0
7	YH-5973	639i	4.5	66.5	68.5	185.0	100.0	13.5
12	YH-5978	608i	4.5	65.5	67.5	117.5	**62.5**	13.0
19	YH-5953	426i	5.5	63.0	65.0	**132.5**	65.0	9.5
CV %		**31.93**	**26.76**	**3.46**	**3.36**	**12.39**	**15.20**	**13.05**
LSD (5 %)		**987.54**	**5.62**	**4.56**	**4.58**	**41.91**	**27.24**	**3.60**

The result unveiled that significant differences were found among all hybrids for all characters in preliminary maize hybrid yield trial (MPMYT-5). It is evident from the results that P-1429gave maximum yield (3350 kg/ha) followed by YH-5679 (2884 kg/ha). YH-5969 seemed to be early maturing by taking 64 days to complete its fifty percent silks while YH-5971 was late maturing taking 70 days to silks. YH-5972 showed maximum plant height (202.5 cm) while YH-5427showed minimum plant height

(132.5 cm). YH-5978showed low cob bearing (62.5 cm) while YH-5967showed high cob bearing (110 cm).

7.3 Demonstration of Local Maize hybrids in comparison to commercial hybrids Spring-2021

This trial was comprised of thirty six (36) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in randomized complete block design with two replications. Plot size was kept 4mx0.75mx5. The data regarding various parameters are presented in the following table.

Table 21: Results of Demonstration-1. Spring-2021

E. No.	Hybrid code	Yield Kg/ha	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)	Stand count
23	YH-5960	9368a	87	66.5	68.5	210	120	89
22	YH-5959	8870ab	69	65.5	67.5	217.5	**137.5**	87
30	YH-5482	8757abc	77.5	68.5	**70.5**	215	117.5	96
7	YH-6025	8252abcd	81.5	63.5	65.5	205	112.5	77
26	YH-5973	8205abcd	85	65	67	212.5	127.5	97.5
6	YH-6024	8177abcd	73.5	65	67	225	117.5	83.5
4	YH-6022	8160abcd	59	64	66	220	120	92
36	DK-6724	8020abcde	71	67.5	69.5	202.5	92.5	74.5
14	YH-5568	7979abcde	73.5	65	67	237.5	135	79.5
31	YH-5427	7969abcde	78	66	68	192.5	112.5	86.5
15	YH-5561	7868abcde	64	62	64	227.5	117.5	86.5
12	YH-6043	7865abcde	67.5	65	67	210	112.5	99.5
29	YH-5980	7809abcde	84	63.5	65.5	190	117.5	85.5
13	YH-6044	7770abcde	59.5	66	68	200	110	74.5
33	FH-988	7755abcde	66	66.5	69	220	120	80.5
24	YH-5961	7726abcde	73	65.5	67.5	200	112.5	90
35	P-1429	7525abcdef	64.5	69.5	72	212.5	107.5	83
20	YH-5957	7511abcdef	71	63	65.5	192.5	107.5	87
21	YH-5958	7502abcdef	73.5	63	65	217.5	117.5	78.5
10	YH-6039	7412abcdef	61.5	63	65	215	125	74
3	YH-6020	7308abcdef	81.5	64.5	66.5	187.5	92.5	74
9	YH-6037	7187bcdef	70.5	63.5	65.5	227.5	127.5	82.5
25	YH-5972	7144bcdef	66.5	61.5	**63.5**	207.5	125	84
11	YH-6038	7130bcdef	77	63	65.5	210	105	86.5
19	YH-5954	7087bcdef	68	63.5	65.5	207.5	115	92.5
32	YH-1898	6964bcdef	73.5	64.5	66.5	202.5	115	78.5
8	YH-6036	6847bcdefg	66.5	62	64	205	105	75
16	YH-5946	6787bcdefg	74.5	66	68	190	112.5	86.5
5	YH-5569	6639cdefg	74.5	62.5	65	200	112.5	94.5
27	YH-5974	6237defg	71	64	66	207.5	122.5	82
34	FH-1046	6233defg	62.5	63	65	**247.5**	105	84
2	YH-6016	6227defg	58	63.5	65.5	205	125	64
28	YH-5975	6006efg	55.5	62	64	202.5	117.5	72

1	YH-6013	5496fg	66	62	64	185	105	85.5
18	YH-5952	5381fg	70	64	66	187.5	102.5	85
17	YH-5949	4717g	71.5	63	65	**155**	**85**	89
CV %		**14.45**	**16.77**	**3.09**	**3.15**	**7.78**	**7.17**	**10.20**
LSD (5 %)		**2150.0**	**24.1**	**4.0**	**4.25**	**32.7**	**16.61**	**17.4**

The above results depicted the performance of thirty-six hybrids. Local hybrid YH-5960 remained at top position by giving 9368 kg/ha followed by local hybrid YH-5959 by giving yield (8870 kg/ha). Local hybrid YH-5972 seemed to be early maturing by taking 64 days to complete its fifty percent silking that comparatively portrayed as early maturing hybrid. Local hybrid FH-1046 showed maximum plant height (247.5 cm) while YH-5949 showed minimum plant height (155 cm). YH-5949also showed lowest cob bearing (85 cm) while hybrid YH-5959 showed highest cob bearing (137.5 cm).

7.4 National Uniform Maize Yield Trial-1 (First Year Testing) Spring-2021

This trial was planted with 129 entries having plot size of 4m x 0.75m x 2 with three replications. The data regarding various parameters are presented in the following table.

Table 22: Results of National Uniform Maize Yield Trial-01 Spring-2021

E. No.	Hybrid code	Grain Yield Kg/ha	Plant Hrv.	Cob Hrv.	Days to tassel	Days to silk	Plant Ht. (cm)	Cob Ht. (cm)
55		8789	33.3	28.7	63.7	65.7	228.3	93.3
73		8741	39.0	40.7	64.3	66.3	221.7	98.3
48		8613	32.7	29.3	64.0	66.0	235.0	105.0
15		8544	36.7	36.7	63.3	65.3	210.0	96.7
25		8517	37.0	34.7	62.3	64.3	230.0	**131.7**
50		8313	34.3	29.0	64.0	66.0	216.7	105.0
28		8252	36.3	31.7	62.7	64.7	226.7	101.7
128		8238	33.0	32.7	61.3	63.3	215.0	90.0
30		8193	35.7	31.0	64.7	66.7	225.0	103.3
47		8156	36.3	34.3	63.0	65.0	241.7	120.0
103		8010	34.3	36.0	62.3	64.3	215.0	90.0
24		7990	35.0	30.7	61.7	63.7	226.7	100.0
56		7944	35.3	32.7	64.3	66.3	211.7	90.0
45		7929	35.3	34.7	63.0	65.0	221.7	108.3
27		7878	36.3	34.7	61.7	63.7	241.7	111.7
62		7873	35.3	32.3	63.7	65.7	215.0	88.3
49		7815	34.3	31.3	62.0	64.0	206.7	86.7
99		7769	35.3	32.0	64.0	66.3	203.3	100.0
113		7755	32.3	30.7	62.3	64.3	223.3	98.3
90		7712	40.0	36.3	62.3	64.3	225.0	110.0
105		7693	33.7	31.7	61.3	63.3	198.3	95.0
63		7680	37.3	34.3	65.3	67.7	**178.3**	**70.0**

11		7643	38.7	35.0	62.3	64.7	226.7	88.3
54		7642	35.7	34.3	65.3	67.3	215.0	91.7
4		7628	40.3	38.7	62.7	64.7	201.7	85.0
123		7583	31.0	28.0	61.7	63.7	195.0	100.0
112		7560	33.3	32.3	62.3	64.0	215.0	98.3
104		7539	33.3	32.3	63.3	65.3	231.7	113.3
122		7491	31.0	27.0	63.0	65.0	213.3	111.7
18		7485	35.3	34.7	63.0	65.7	208.3	93.3
26		7447	32.7	30.0	63.0	65.0	220.0	100.0
77		7430	30.3	29.3	61.7	63.7	223.3	98.3
87		7428	31.7	29.3	62.3	64.3	225.0	105.0
117		7415	28.3	24.0	62.7	64.7	195.0	96.7
66		7396	32.7	31.7	65.7	67.7	220.0	100.0
46		7360	30.7	27.0	66.7	**68.7**	230.0	101.7
57		7340	35.7	34.0	63.3	65.3	211.7	95.0
97		7281	35.0	37.7	64.0	66.0	220.0	106.7
92		7280	35.7	36.0	63.7	65.7	210.0	95.0
17		7216	32.7	31.3	63.7	65.7	223.3	95.0
19		7212	36.0	34.3	63.3	65.3	205.0	85.0
35		7160	35.7	35.3	65.0	67.3	233.3	113.3
7		7156	32.7	30.0	62.7	64.7	203.3	91.7
34		7142	35.3	31.3	62.7	64.7	206.7	88.3
126		7141	30.3	29.3	64.0	66.3	206.7	81.7
40		7136	36.3	31.0	65.3	67.3	208.3	93.3
36		7102	37.0	34.7	65.7	67.7	208.3	90.0
91		7095	33.3	32.0	63.7	65.7	228.3	95.0
108		7085	32.3	29.0	63.3	65.7	226.7	110.0
60		7076	27.3	25.7	62.0	64.0	240.0	103.3
93		7068	37.3	33.0	62.3	64.3	221.7	100.0
95		7063	30.7	27.3	64.0	66.3	**245.0**	108.3
59		7059	34.0	31.3	63.3	65.3	185.0	81.7
119		7054	30.7	28.7	62.3	64.0	210.0	91.7
29		7009	36.7	33.3	62.7	64.7	228.3	98.3
118		7008	30.3	25.3	62.3	64.3	198.3	90.0
51		6930	35.0	30.0	63.0	65.0	216.7	91.7
80		6928	32.7	30.0	65.0	67.0	211.7	90.0
67		6914	32.0	32.0	63.7	65.7	213.3	96.7
10		6908	37.7	35.3	61.7	63.7	200.0	95.0
96		6897	36.7	34.3	62.0	64.0	200.0	85.0

101		6877	35.3	32.3	62.7	64.7	208.3	95.0
109		6857	35.3	33.0	63.0	65.0	233.3	110.0
39		6854	36.7	33.0	62.7	64.7	201.7	75.0
94		6849	39.0	36.0	64.0	66.0	198.3	80.0
8		6830	37.3	32.3	62.0	64.0	201.7	91.7
111		6825	35.7	34.7	61.7	63.7	205.0	91.7
100		6796	38.7	34.7	63.3	65.0	221.7	100.0
68		6795	32.7	33.0	65.3	67.3	211.7	88.3
9		6787	35.7	28.7	63.7	65.3	203.3	103.3
116		6781	28.7	24.7	63.3	65.3	210.0	96.7
16		6773	35.3	34.3	62.3	64.3	206.7	95.0
69		6764	34.7	31.7	64.3	66.3	220.0	100.0
121		6738	32.0	28.7	63.3	65.3	218.3	120.0
102		6718	34.7	30.3	62.0	64.0	231.7	118.3
61		6710	31.3	29.7	62.7	64.7	221.7	103.3
65		6681	32.0	30.3	63.3	65.3	221.7	91.7
6		6647	37.0	31.0	63.3	65.3	198.3	88.3
83		6639	30.3	29.0	61.0	**63.0**	196.7	86.7
79		6627	29.3	26.7	63.7	66.0	216.7	98.3
41		6610	34.7	31.3	66.3	68.7	220.0	103.3
106		6587	30.0	26.0	62.3	64.3	203.3	106.7
78		6583	31.0	26.7	65.0	67.0	206.7	83.3
114		6563	31.7	30.0	62.7	64.7	238.3	103.3
53		6539	34.7	32.7	62.7	64.7	225.0	100.0
84		6505	31.3	28.7	63.7	66.0	216.7	91.7
32		6491	33.3	28.7	62.3	64.3	208.3	98.3
58		6488	30.3	26.0	63.7	65.7	198.3	90.0
31		6478	34.3	30.0	63.7	65.7	215.0	100.0
20		6448	34.0	28.7	63.7	65.7	193.3	75.0
70		6419	31.3	27.7	62.7	64.7	211.7	90.0
124		6404	30.3	27.7	63.3	65.0	205.0	81.7
89		6391	31.3	29.0	64.0	66.0	208.3	88.3
81		6380	31.3	28.0	63.3	65.3	198.3	90.0
98		6333	34.7	30.0	63.3	65.3	228.3	105.0
52		6315	26.0	25.0	64.3	66.3	208.3	108.3
12		6312	37.0	30.0	65.0	67.0	198.3	95.0
127		6288	27.7	24.7	64.0	66.0	195.0	103.3
21		6273	32.7	30.3	63.3	65.3	195.0	90.0
5		6257	33.7	30.0	63.3	65.3	210.0	78.3

85		6245	30.7	29.3	62.7	64.3	188.3	76.7
43		6162	33.0	28.3	64.0	66.0	210.0	81.7
64		6134	29.0	25.7	64.3	66.3	216.7	100.0
86		6090	32.0	28.3	63.7	65.7	220.0	91.7
76		6025	27.0	23.3	64.7	66.7	206.7	86.7
2		6022	34.7	26.0	63.0	65.0	223.3	91.7
82		5997	33.7	32.7	63.0	65.0	240.0	95.0
72		5984	31.0	29.7	63.3	65.3	203.3	88.3
129		5979	28.3	26.0	63.7	65.7	205.0	98.3
3		5953	38.0	32.3	64.0	66.3	210.0	86.7
22		5951	33.0	31.0	64.0	65.7	203.3	101.7
110		5949	27.7	26.0	63.0	65.0	210.0	95.0
37		5908	33.7	30.3	62.3	64.3	210.0	100.0
115		5884	28.7	24.7	63.3	65.0	226.7	123.3
33		5833	33.3	29.3	66.7	69.0	213.3	95.0
75		5788	31.3	27.7	61.3	63.3	198.3	105.0
14		5707	36.0	27.7	63.0	65.0	213.3	101.7
88		5627	35.0	31.0	63.3	65.3	195.0	95.0
74		5626	30.3	27.7	63.7	65.7	205.0	106.7
42		5608	36.7	31.3	62.0	64.0	191.7	86.7
44		5602	32.7	28.3	61.7	63.7	216.7	95.0
13		5546	34.3	29.7	63.3	65.3	193.3	91.7
120		5291	29.3	25.0	63.0	65.3	208.3	95.0
1		5127	33.0	27.0	62.7	64.7	203.3	90.0
71		5055	30.3	28.7	62.3	64.3	198.3	110.0
107		4923	28.3	25.7	61.3	63.7	191.7	100.0
23		4867	37.7	28.7	62.7	64.7	221.7	121.7
125		4601	20.3	18.7	62.7	64.7	200.0	100.0
38		4486	34.3	25.3	66.3	68.3	201.7	100.0
CV %		**19.17**	**13.30**	**16.30**	**2.92**	**2.86**	**7.80**	**14.74**
LSD (5 %)		**2107.4**	**7.14**	**7.97**	**2.97**	**2.90**	**26.67**	**22.92**

It is evident from the results presented in table that all the hybrids expressed statistically significant differences among all hybrids for all characters in. It is evident from the results that Entry No. 55 gave maximum yield (8789 kg/ha) followed by Entry No. 73 (8741 kg/ha). Entry No. 83 seemed to be early maturing by taking 63 days to complete its fifty percent silks while Entry No.46 was late maturing taking 69 days to silks. Entry No. 95 showed maximum plant height (245 cm) while Entry No. 63 showed minimum plant height (178.3 cm). Entry No. 63 also showed low cob bearing (78 cm) while Entry No. 25 showed high cob bearing (131.7 cm).

HYBRID MAIZE (WHITE)

1.1.1 Derivation of Inbred Families

One hundred &thirty four (134) derivative families of different generations were sown in ear to row fashion during Kharif, 2020 for derivation of inbred lines through hand pollination. At maturity, selfed plants were harvested in each family, separately, and seed of 160 families was collected / added for further derivation and selection cycles.

During Spring-2021, 160derivative families were sown in ear to row fashion for derivation of inbred lines. Undesirable lines and plants were rejected at various stages and only desirable lines and plants were self-pollinated manually. At maturity, selfed plants were harvested in each family, separately, and seed of 118 derivative families was collected / added for further derivation and selection cycles.

1.2.1. Maintenance of Inbred Lines

During Kharif 2020, 61 inbred lines were sown in ear to row fashion for maintenance through hand-pollination. Sixty one (61) inbred lines were finally selected and maintained while 3, newly derived inbred lines, were also added in maintenance which resulted in 64 inbred lines. During spring 2021, 64 inbred lines were sown for maintenance and undesirable lines and plants were rejected at various stages and only desirable lines and plants were self-pollinated manually. At maturity, selfed plants were harvested in each family, separately, and seed of 67 inbred lines was collected / added for further derivation and selection cycles.

1.2.2. Hybrid Constitution

During Kharif 2020, hybrid constitution block consisting of 29 maize inbred lines as female with one male was sown in isolation in 4:1 ratio. Detasseling of female lines was practiced before anthesis to prevent any type of selfing. At maturity, seed of 29 lines was harvested for further evaluation. During spring 2021, hybrid constitution block consisting of 50 maize inbred lines as female with one male was sown in isolation in 4:1 ratio. Detasseling of female lines was practiced before anthesis to prevent any type of selfing. At maturity, seed of 50 lines was harvested for further evaluation.

1.2.3. Hybrid Evaluation

During Kharif 2020, a trial consisting of 48 entries was conducted following RCBD with two replications. Data regarding different traits were recorded at different growth stages/physiological maturity and analyzed statistically. Results are summarized below in tabulated form on mean basis.

Table 23: Results of Preliminary Hybrid Maize Yield Trial Kharif, 2020

Rank No.	Entries	Grain Yield (Kg/ha)	Days to 50 % silk	Plant ht. (cm)	Cob ht. (cm)
1	YWH-19	9881 a	49	207	108
2	SB-292	9719 a	53	196	105
3	YWH-15	9448 ab	50	212	109
4	YWH-18	9253 abc	50	200	108
5	YWH-29	9248 abc	50	212	113
6	YWH-12	8719 abc	50	207	112
48	YWH-2	2164 k	55	115	66

	CV %	15.1	2.6	8.1	11.1
	LSD (0.05)	2314.1	2.7	30.3	21.1

The results revealed that YWH-19 stood at 1st position by giving grain yield of 9881 kg/ha followed by SB-292 with grain yield of 9719 kg/ha, both are statistically at par while YWH-2 gave the minimum grain yield of 2164 kg/ha. Maximum plant height of 212 cm was attained by YWH-15 whereas YWH-2 attained the minimum plant height of 115cm. YWH-2showed low level bearing with 66 cm cob height while YWH-29 showed the highest bearing of 113 cm.

During spring 2021, a trial consisting of 35entries was conducted following RCBD with two replications. Data regarding different traits were recorded at different growth stages/physiological maturity and analyzed statistically. Results are summarized below in tabulated form on mean basis.

Table 24: Results of Preliminary Hybrid Maize Yield Trial Spring, 2021

Rank No.	Entries	Grain Yield (Kg/ha)	Days to 50 % silking	Plant ht. (cm)	Cob ht. (cm)
1	3025W	12649 a	76	205	98
2	YWH-19	10730 ab	71	200	100
3	YWH-29	10318 abc	72	210	105
4	YWH-15	10012 abc	73	215	110
5	YWH-17	9827 abc	76	207	105
6	YWH-12	9744 abc	74	210	110
35	YWH-2	1937 h	78	125	70
	CV %	12.1	1.29	8.35	8.78
	LSD (0.05)	1600	3.2	18.2	10.5

The results revealed that 3025W stood at 1st position by giving grain yield of 12649 kg/ha followed by YWH-19 with grain yield of 10730 kg/ha, both are statistically at par while YWH-2 gave the minimum grain yield of 1937 kg/ha. Maximum plant height of 210 cm was attained by YWH-29 whereas YWH-2 attained the minimum plant height of 125 cm. YWH-2 showed low level bearing with 70 cm cob height while YWH-29 showed the highest bearing of 105 cm.

2. SEED PRODUCTION OF OPV's

Different seed categories of various maize varieties were produced for maintenance, experiments and sale purposes. The BNS seed was produced through half-sib method by hand pollination while Pre-basic was produced in isolations. Details of seed produced are given below:

Sr. No.	Name of Crop Variety	BNS (kg)	Pre-basic (kg)	Basic (kg)	Certified (kg)
Maize Kharif, 2020					
1.	GOHAR-19	6.0	5330	-	-
2.	CIMMYT PAK	3.0	-	-	-
3.	SWEET-1	3.0	-	-	-
4.	POP-1	3.0	-	-	-

Maize Spring, 2021					
1.	GOHAR-19	6.0	4230	-	-
2.	CIMMYT PAK	5.0	-	-	-
3.	SWEET-1	3.0	-	-	-
4.	POP-1	1.0	-	-	-

OPV MAIZE:

1. Seed Production of Open Pollinated Variety Sahiwal Gold

Seed from previous year crop was sown in an isolation of 4 kanal during spring 2020 at MMRI & 2 Acres at Govt. Maize Seed Farm Iqbal Nagar. Detasseling was made with the ratio of 1:4. The weak plants were eliminated and remaining crop was harvested.

2. Improvement and Maintenance of Yusafwala Pool-50

Seed received from Kharif 2019 was mixed and sown in isolation of 2 kanals during spring 2020. Crop was harvested at maturity and random sample from bulk material was kept for next sowing.

3. Ear to Row Trial for new variety development

Fifty Two selected cobs from previous trial were sown ear to row method. Detasseling was made with the ratio of 1:3. About 160 ears were selected from different plants on the basis of plant height, stem girth, light tassel, cob length and lodging resistance. Out of 160 ears 62 ears were further selected on the basis of ear related (cob length, thin pith, no. of rows / ear, now of grains / row and grain boldness) characteristics for sowing in next season.

SORGHUM
KHARIF 2020:

1. MAINTENANCE OF BREEDING MATERIAL:

i. Gene Pool

Eighty Four (84) pure lines from Yusafwala were planted for maintenance in strips with 5 m x 1.5 m plot size. Five true to type plants were selected and covered their panicles before anthesis to avoid foreign pollen contamination so that true to type seed of all germplasm could be produced. Seven lines were rejected due to disease susceptibility. All the remaining selected /covered plants were harvested for further maintenance.

ii. Cytoplasmic Male Sterile (A) Lines.

Thirty eight (38) cytoplasmic male sterile (A) lines and their counterpart (B) lines were planted for maintenance in strips having 5 m x 2.25 m plot size. Panicles of ten plants from each A and B line were covered before anthesis for the production of pure seed of lines. Five lines were rejected due to disease susceptibility. All the remaining "A" lines were maintained with their counterpart "B" lines

iii. Fertility Restorer Lines

Thirty (30) restorer (R) lines were planted for maintenance in strips with 5m x 1.5m plot size. Five true to type plants were selected in each line and their panicles were covered before anthesis to avoid pollen contamination. At maturity, panicles of each line were harvested separately and enough

seed was collected for further maintenance and utilization in hybrid programme. Five lines were rejected due to disease susceptibility. Remaining all lines were maintained.

2. BREEDING:

i. Hybrids Constitution: (CMS × Restorers)

Twenty six (26) hybrids (CMS x R) crosses were constituted (22 in isolation and 4 by hand) during Kharif 2020 for their evaluation to identify the best commercial hybrid. The panicles of CMS lines and restorers were covered with craft paper bags before anthesis. After 5-6 days, collected the pollen from restorers and hand pollination of CMS lines were done. While in two isolation blocks CMS & R lines with different R line each i.e., R-22, R-25 and YSS-98 were planted 3:1 as female: male and allowed to open pollinate. Sufficient to small quantity of seed from crosses was produced for evaluation during next crop season.

ii. Filial Generations:

Total 31 filial F-families (10 F_2, 17 F_3, 1 F_5& 3 F_6) were planted and phenotypically superior plants from families were selected. Seventeen (17) F_3 families were selected from 10 F_2 in Kharif 2020. One F_5 family was selected from eight F_4, Three F_6 were selected from 3 F_5; phenotypically superior plants from families were selected. Ten (10) F_2 families were selected form hybrid trials based on their head length and brix value.

iii. Mutated Lines

Eleven (11) Mutated selected lines from Kharif 2020 were planted and 7 entries were selected based on their head length and brix value for sowing in Kharif 2021.

iv. Head to Row Families:

Head to row selection blocks were sown for maintenance, purification and improvement of approved varieties. True to type plants were selected from uniform and disease free rows. The number of heads selected from each variety is given below:

Table-25: Number of Heads of Each Variety

Sr. No.	Variety	No. of Selected Heads	Status
1	YSS-98	90	Approved
2	YS-16	320	Approved

3. EVALUATION:

Following yield trials were conducted during the period under report to evaluate the promising material.

i. Sorghum Hybrid Yield Trial 1, Kharif 2020

Seventeen (17) (CMS x R) hybrids were tested including two checks (Fakhar e Punjab & YS-16). The trial was laid out according to RCB design with three replications having plot size of 5m x 1.5m. Data regarding grain yield and other important plant characteristics were recorded and presented below in below table.

Table-26: Results of Sorghum Hybrid Yield Trial 1 for Kharif-2020

Hybrid	Grain Yield (kg/ha)	Stand Count	Head length (cm)	FLA (cm2)	Stem Girth (cm)	Brix Value	Stalk Weight (kg/ha)
YSH-132	8066.67	34.33	28.00	230.19	2.68	14.93	51666.67

YS-16 ©	6500.00	38.67	23.67	123.30	2.19	11.80	44166.67
YSH-197	5777.78	36.67	31.00	282.52	2.79	1.80	42500.00
YSH-143	5183.33	26.00	26.00	148.63	2.34	13.03	24166.67
YSH-216	5125.00	24.67	29.33	153.23	2.96	3.93	34166.67
YSH-145	4616.67	31.00	30.00	275.67	2.24	8.73	39166.67
YSH-223	4586.81	42.33	34.67	97.36	2.84	13.83	48333.33
YSH-224	3791.67	34.33	37.67	236.81	2.66	4.83	53333.33
YSH-193	3740.94	22.00	25.33	142.13	2.44	8.40	30000.00
Fakhar e Punjab ©	3141.67	23.33	31.00	268.54	2.43	9.50	35000.00
YSH-200	3125.00	39.67	35.00	276.82	2.30	16.10	19166.67
YSH-131	2891.67	32.33	24.00	147.73	1.92	2.17	33333.33
YSH-205	2615.74	36.33	28.67	223.27	2.45	8.40	32500.00
YSH-178	1875.00	40.00	26.33	98.95	2.29	9.90	33333.33
YSH-187	1423.56	27.00	26.00	183.72	2.37	19.70	43333.33
YSH-175	1333.33	28.00	28.00	114.83	2.18	17.93	45833.33
YSH-212	1069.43	32.67	29.67	133.22	2.70	9.60	61666.67
YSH-188	895.83	14.00	23.67	457.25	2.25	11.30	38333.33
YSH-185	403.62	23.33	27.67	203.80	1.98	7.63	25833.33
CV	21.76	10.79	11.29	67.57	11.58	4.10	21.41
LSD	618.00	2.72	2.65	110.00	0.22	0.34	6776.00

It is evident from the above Table that YSH-132 gave significantly higher yields (8066.67 kg/ha) followed by YS-16 (6500 kg/ha) and so on. Maximum stalk yield of 61666.67 kg/ha was produced by YSH-212 followed by YSH-224 (53333.33 kg/ha). Sorghum hybrid YSH-132 &YSH-212 showed higher and top performance than local checks regarding grain yield/ ha and stalk yield / ha respectively.

ii. Sorghum Hybrid Yield Trial 2, Kharif 2020

Fifteen (15) (CMS x R) hybrids were tested including one check (Fakhar e Punjab). The trial was laid out according to RCB design with three replications having plot size of 5m x 1.5m. Data regarding grain yield and other important plant characteristics were recorded and presented in below table.

Table-27: Results of Sorghum Hybrid Yield Trial 2 for Kharif-2020

Hybrid	Grain Yield (kg/ha)	Stand Count	Days to Heading	Plant Height (cm)	Head length (cm)	FLA (cm2)	Stem Girth (cm)	Brix Value
Fakhar e Punjab	6508.33	34.00	64.00	180.00	27.33	150.72	2.41	5.80
YSH-170	6213.54	18.00	66.33	221.67	32.33	258.83	2.15	4.73
YSH-153	6054.49	29.67	53.00	226.67	27.33	204.75	2.15	19.53
YSH-194	5800.51	33.00	52.00	206.67	35.00	188.25	2.16	2.33
YSH-199	4604.17	34.33	55.00	211.67	30.33	115.97	1.86	4.43
YSH-217	969.25	23.00	61.00	156.67	28.33	151.54	2.56	14.67
YSH-210	735.56	13.67	74.00	148.33	25.00	187.05	2.30	16.17

YSH-202	723.21	22.33	68.00	166.67	31.00	178.36	2.28	7.27
YSH-214	721.67	10.33	73.00	146.67	25.67	175.13	2.85	12.60
YSH-213	671.88	22.67	69.00	173.33	27.67	109.08	2.72	7.07
YSH-191	425.00	10.00	72.33	148.33	30.67	150.94	2.38	11.50
YSH-221	386.36	12.67	68.33	161.67	26.00	254.23	3.00	4.87
YSH-189	313.33	6.67	74.50	160.00	28.33	133.15	3.28	7.93
YSH-196	271.43	8.33	74.00	153.33	33.00	221.78	2.60	12.57
YSH-203	191.67	15.67	53.00	140.00	21.67	120.31	2.17	12.57
YSH-183	130.21	7.67	75.00	175.00	34.67	101.82	3.27	2.10
CV	38.05	26.93	9.49	11.22	11.79	26.19	19.68	6.29
LSD	674.00	4.15	-	15.90	2.79	36.11	0.40	0.46

It is evident from the above Table that Fakhar e Punjab exceeded all the hybrids and gave significantly higher yields (6508.33kg/ha) followed by YSH-170 (6213.54 kg/ha) and YSH-153 (6054.49 kg/ha).

iii. Sorghum Varietal Yield Trial I, Kharif 2020

Ten (10) varieties were evaluated with one check YS-16. The trial was laid out according to RCB design with three replications having plot size of 5m x 1.5m. Data regarding grain yield per plot and other important plant characteristics were recorded. The data are presented in below table.

Table 28: Results of Sorghum Varietal Yield Trial I for Kharif-2020

Hybrid	Grain Yield (kg/ha)	Stand Count	Head length (cm)	Stem Girth (cm)	FLA (cm2)	Stalk Weight (kg/ha)
YSS-17	5500	36	27	2.385	248.6	40000
YSS-31	4125	36	23	2.295	167.61	35000
YSS-18	4000	29	22	2.5	155.75	37500
YSS-41	3625	30	25	1.955	164.25	50000
YSS-38	3250	22.5	26.5	3.17	153.15	25000
YSS-10	2600	20	29	2.925	141.8	38750
YSS-23	2437.5	30	20	1.84	177.2	55000
YSS-16	2125	32.5	20.5	2.43	192.75	51250
YSS-25	1875	17.5	25.5	2.395	237.89	62500
YSS-42	1625	15	25.5	2.955	178.7	20000
CV	17.21	27.32	13.19	11.4	46.21	1.8
LSD	554.2	7.33	3.21	0.02	-	745.4

Statistical analysis of the data given in Table revealed that the Entry YSS-17 gave significantly higher yields (5500 kg/ha) along with YSS-31 (4125 kg/ha) and YSS-18 (4000 kg/ha) at MMRI in comparison to check YS-16, 2125 kg/ha. Maximum stalk yield of 62500 kg/ha was produced by YSS-25 followed by YSS-23 (55000 kg/ha) and YS-16 (51250 kg/ha

iv. Sorghum Varietal Yield Trial II, Kharif 2020

Ten (10) varieties were evaluated with two check YSS-98 and YS-16. The trial was laid out according to RCB design with three replications having plot size of 5m x 1.5m. Data regarding grain yield per plot and other important plant characteristics were recorded. The data are presented in below table.

Table 29: Results of Sorghum Varietal Yield Trial II for Kharif-2020

Hybrid	Grain Yield (kg/ha)	Stand Count	Head length (cm)	Stem Girth (cm)	FLA (cm2)	Stalk Weight (kg/ha)
YSS-50	3875	23.5	2.055	17.40476	65.1	43511.9
YSS-49	3750	33	2.335	6.564516	177.95	16411.29
YSS-98	3500	26.5	1.715	21.48148	128.35	53703.7
YSS-43	2837.5	26.5	2.73	13.36364	121.36	33409.09
YSS-48	2700	31	2.625	17.76923	162.06	44423.08
YS-16	2625	28	2.93	12.25	194.99	30625
YSS-46	2000	28.5	2.58	2.571429	79.92	6428.571
YSS-47	1625	24.5	2.495	15.5	199.8	38750
YSS-44	912.5	24	2.38	17.11111	63.64	42777.78
YSS-45	750	27	2.605	23	133.16	57500
CV	21.24	43.93	21.61	20.78	58.57	35.81
LSD	521.88	7.95	5.88	0.5	77.68	13162

Statistical analysis of the data given in Table revealed that the Entry YSS-50 gave Significantly higher yields (3875 kg/ha) along followed by check YSS-49 (3750 kg/ha) and YSS-98 (3500 kg/ha). Maximum stalk yield of 57500 kg/ha was produced by YSS-45.

4. National Uniform Yield Trial Kharif 2020

Sixteen (16) varieties/hybrids were tested in a trial. The trial was laid out according to RCB design with three replications having plot size of 5m x 1.5m. Data regarding grain yield per plot and grain yield performance of prominent entries is presented in below table.

Table 30: National Uniform Yield Trial for Kharif-2020

Entries	Name	Yousafwala
1	Nagina	6500
2	R-3636	3622
3	W-3535	4088
4	Q.S-499	986
5	16GS2670	2884
6	YSH-134	3651
7	YSS-10	5389
8	Eagle	5039
9	Sweet As	3590
10	Omega-F1	6522

11	Fakhr-e-Punjab (CHECK)	3842
12	14SB7001	2281
13	YS-16 (CHECK)	4039
14	Sweet Betty	3495
15	YSH-132	5250
16	YSS-42	5649
CV%		12.45
LSD (0.05%)		867.33

The results presented in Table revealed that YSS-42 (5649 kg/ha), a candidate variety and sorghum hybrid YSH-132gave higher yield (5250 kg/ha) than checks.

PEARL MILLET (*Pennisetum glaucum* (L.) R. Br.):

1. BREEDING:

1.1 Maintenance of Gene Pool

Sixteen (16) gene pool lines were planted on 03-08-2020. Each entry was sown in two row strips of 4-meter length. One row was kept vacant between two lines to facilitate the breeding work at flowering. The row to row distance was 75 cm and plant to plant distance was 20 cm. At the time of flowering three plants were selected from each line and three to six heads were covered with butter paper bags before emergence of stigmas for self-pollination. After maturity the self-pollinated heads of each line were harvested separately on 04-12-2020, sundried, threshed and seed was stored for future use.

1.2 Maintenance of Cytoplasmic Male Sterile Lines

Nine (9) cytoplasmic male sterile (A) lines and twenty-five (25) cytoplasmic male fertile (B) lines were planted on 03-8-2020in two row strips of 4-meter length with row spacing 75 cm and plant spacing 20 cm. One row was kept vacant between two lines to facilitate the breeding work at flowering. At the time of flowering 3 plants were selected from each A & B line and 3-6 heads were covered with butter paper bags before emergence of stigmas for maintenance and self-pollination, respectively. After maturity the heads of each line were harvested separately on 04-12-2020, sundried and threshed. Reasonable seed was collected, which was stored.

1.3 Maintenance of Fertility Restorer Lines

Twenty five (25) fertility restorer lines were planted on 03-8-2020 in two row strips of 4-meter length with row spacing 75 and plant spacing 20 cm. One row was kept vacant between two lines to facilitate the breeding work at flowering. At the time of flowering three plants were selected from each line and three to six heads were covered with butter paper bags before emergence of stigmas for self-pollination. After maturity the self-pollinated heads of each line were harvested separately on 04-12-2020, sundried and threshed. Reasonable seed was collected, which was stored.

1.4 Derivation of Fertility Restorer Lines

Four S_5, three S_6 and twenty- S_7Fertility Restorer Derivative lines were sown in two row strips of 4-meter length for derivation on 04-08-2020. Row to row and plant to plant distances were 75 cm and 20 cm respectively. One row was kept vacant between two lines to facilitate the breeding work at flowering. At the time of flowering three plants were selected from each line and three to six heads were covered with butter paper bags before emergence of stigmas for self-pollination. After maturity self-pollinated heads of each line were harvested separately on 05-12-2020, sundried and threshed. Reasonable seed was procured and stored for future use.

1.5 Constitution of Pearl Millet Hybrids.

During Kharif 2020, twenty four (24) new crosses were made by hand pollination. Crossed heads from female parents were harvested separately. The harvested heads were sundried, threshed and packed after cleaning of seed for planting in next season.

2. EVALUATION:

2.1 Pearl Millet Varietal Yield Trial, Kharif-2020

The trial was comprised of twelve (12) varieties including two check varieties (YBS-98) and (86M88) sown in Randomized Complete Block Design with three replications on 08-08-2019. Plot size was kept 1.5m x 5m. Row to row and plant to plant distances were kept 75 cm and 20 cm respectively. The trial was harvested on 08-12-2020. Data were recorded for grain yield and various other agronomic traits some of which are presented in the following table: -

Table 31: Results of Pearl Millet Varietal Yield Trial for Kharif-2020

Sr. No.	Verities	Grain Yield kg/ha	Stalk Yield kg/ha	Plant Height (cm)	Days to 50%	Head Wt. kg/plot
01	YBH-278	5718	46239	242	59	2.44
02	86M88 ©	4592	45033	260	55	3.15
03	YBS-98 ©	3790	38683	278	54	2.22
04	YBS95	3692	40317	255	54	2.10
05	YBS-93	3351	43933	248	58	2.06
06	YBS-92	3289	45551	272	57	2.22
07	YBS-83	3054	43112	255	58	1.70
08	YBS89	2913	39877	275	53	1.68
09	YBS-94	2867	44413	280	55	1.59
10	18BY	2831	47614	278	55	1.65
11	YBS70	2799	39989	288	52	1.33
12	YBR5	2554	32856	245	51	1.41
CV%		15.22	8.55	1.77	1.92	12.67
Cd1		1650	4812	11.41	2.07	0.90

The results presented in Table revealed that YBH-278 produced maximum grain yield of 5718 kg/ha followed by 86M88(check) andYBS98 (Check) with grain yield of 4592 and 3790kg/ha respectively. WhereasYBR-05 remained at the bottom with grain yield of 2554 kg/ha.

2.2 Pearl Millet Hybrid Yield Trial

The trial comprised of twenty four entries which were obtained through crosses. All entries were sown in the autumn 2020 to study their yield potential along with Morphological attributes. Data were recorded and presented in the following table.

Table 32: Pearl Millet Hybrid Yield Trial for Kharif-2020

Sr. No.	Entries	Grain Yield (kg/ha)	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50%	Head Wt. (kg/plot)
1	YBH-278	5925	45239	232	60	3.12
2	86M88 (check)	5078	33334	235	55	2.97
3	YBH-302	4643	38096	245	45	2.97

4	YBH-277	4560	34525	232	55	2.72
5	YBH-294	4441	27382	247	51	1.58
6	YBH-292	4298	32144	232	54	2.50
7	YBH-283	4059	38096	287	48	2.62
8	YBH-289	3940	33334	227	51	2.47
9	YBH-285	3929	28572	270	50	2.43
10	YBH-301	3845	39287	257	52	2.66
11	YBH-307	3845	32144	205	49	2.51
12	YBH-306	3691	44049	222	54	2.52
13	YBH-284	3536	22620	242	50	2.19
14	YBH-286	3512	33334	257	51	2.85
15	YBH-279	3440	32144	227	49	2.28
16	YBH-280	3428	40477	267	51	2.01
17	YBH-293	3393	32144	267	49	2.09
18	YBH-295	3369	34525	232	51	2.30
19	YBH-288	3214	23810	232	51	1.92
20	YBH-305	3167	42858	217	55	2.01
21	YBH-282	3047	36906	230	47	2.15
22	YBH-304	2976	29763	202	51	1.85
23	YBH-276	2869	17858	182	50	1.63
24	YBH-281	2666	28572	232	46	2.07
CV%		13.35	10.15	1.85	1.17	9.81
Cd1		1082	301	18.04	2.33	0.915

The results presented in Table indicate that YBH-278 gave maximum grain yield of 5925 kg/ha followed by check variety 86M88 (5078 kg/ha).

3. Adaptability/National Uniform Pearl Millet Hybrid Yield Trial Kharif-2020

The trial comprising of thirty-one (31) entries was received from the National Coordinator of MSF & OC, NARC Islamabad, sown on 03-08-2020 in Randomized Complete Block Design with three replications keeping plot size of 5m x 3 m. The row to row and plant to plant distances were 75 cm and 20 cm respectively. The trial was harvested on 06-12-2020 after maturity. Data regarding grain yield, stalk yield, plant height, days to 50% anthesis and disease score were recorded which are presented in the following table

Table 33: Adaptability / National uniform Pearl Millet Yield trial for Kharif-2020

Sr. No.	Entries	Grain Yield (kg/ha)	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50%	Head Wt. (kg/plot)
1	Shahansha	4664	34128	245	55	3.42
2	N-95	4500	34128	245	56	3.50
3	Global	4584	34128	242	54	3.27
4	Shahansh gold	4832	30159	230	56	3.34
5	Hercules	4592	33214	267	58	3.07
6	LG-98	5144	33334	244	57	3.31
7	SD-55S20	5232	24604	240	55	2.86
8	SD55S90	4336	26985	238	59	2.83
9	SD55S95	4344	31255	250	58	2.15

10	RS-MASTER	5040	34128	252	58	2.93
11	Mughal e Azam	5144	36509	244	59	3.17
12	Fareed-01	4840	30953	255	59	2.95
13	AAS-7868	7868	34128	223	53	2.90
14	HP-233	5177	31747	282	59	2.79
15	86M20	5440	34128	246	55	2.75
16	86M38	5176	34921	240	53	2.92
17	ML-72	5440	34128	235	62	3.17
18	Jumbo	5176	34921	232	63	2.57
19	Fighter-72	3796	31747	242	62	2.19
20	HS LONG Jum	4000	29366	263	60	2.21
21	QS299	4544	32540	231	56	2.22
22	Rustam-King	3728	26191	253	62	1.79
23	DS-1312	3360	27778	244	62	1.70
24	YBS-98 (check)	3688	30953	285	54	3.31
25	YBH-278	4248	34128	252	59	2.86
26	PM-61	3840	31747	226	57	2.83
27	PM-65	4336	34128	250	57	2.15
28	G-127	3680	34921	232	57	2.93
29	14RBS-05	3292	34128	263	53	3.17
30	16RBS-10	3508	34921	270	56	2.95
31	16RBS15	3544	31747	278	57	2.90
	CV	14.53	10.15	6.52	2.13	11.20
	Cd1	1016.50	2090	26.43	2.00	0.980

The results presented in Table indicate that shahansh gold gave maximum grain yield of 4664 kg/ha followed by N-95 (4500 kg/ha), whereas 16RBS-15 performed poorly in the trial with merely 3544kg/ha yield.

4 OPV SEED PRODUCTION

Pear millet approved variety YBS-98 (OPV) and other elite lines were sown in the autumn 2020 and 1085 kg of seed was produced, harvested, threshed and stored as per need at the institute.

4.2 Hybrid Seed Production

An area of 3 acres was sown during Kharif-2020 for hybrid seed production of (YBH-278). Male parent was sown 14 days earlier than female parent. Four Hundred fifty (450 kg) seed was produced.

4.3 Spring 2020

Seed Multiplication of CMS-A Line along with Its Counter Part B Line

CMS- 72-A line along with its counterpart B line which were sown during the month of January to February in four blocks with different sowing dates to evaluate the developmental behavior of these lines during spring season / winter as well as for seed increase purpose. Seed setting remained poor in January sowing blocks and not exceeded 30% whereas last block with late February sowing date showed good seed setting (85%) due to the relatively cool temperature due to rains and cloudy environment at

the time of pollination. Harvesting of all four blocks was completed. Heads were dried, threshed and the seed was stored.

AGRONOMY:
KHARIF 2020:

1. Optimum plant spacing of hybrid maize (YH-5427) on bed sowing

The objective of the experiment was to find out the suitable planting density for maize hybrid in 1.05 m wide bed furrow top sowing. Treatments comprised of five plant spacing's viz. 17.5, 20.0, 22.5, 25.0, 27.5 cm. sowing was done on the both slant of sides of the bed top. Treatments were laid out in randomized block design, replicated thrice. Results depicted in table showed that plants at 17.5cm plant spacing reached to days to 50% silking earlier ($P<0.05$) compared to other treatments. The effect of treatments on plant height and ear height was not significant ($P>0.05$). Number of ears ha^{-1} decreased significantly as plant spacing increased from 17.5 cm to 27.5 cm. Fresh ear weight and grain yield was maximum at 17.5cm and decreased significantly with increase in plant spacing. Minimum fresh ear weight and grain yield was recorded when plants were planted at 27.5 cm apart. It may be concluded that Hybrid YH-5427 should be planted at 17.5 cm plant spacing in case of bed sowing in kharif season to attain maximum grain yield.

Table 34: Effect of different plant spacing on maize hybrid under bed sowing method during Kharif-2020 at MMRI, Yusafwala

Plant Spacing (cm)	Grain yield (kg ha^{-1})	Days to 50% Silking	Plant height (cm)	Ear Height (cm)	No. of ears ha^{-1}	Fresh ear weight (kg ha^{-1})
17.5	12000 a	53 b	232	108	88095 a	18988 a
20.0	10927 b	54 a	231	101	69048 b	17361 b
22.5	10440 bc	54 a	228	100	63889 bc	16774 bc
25.0	10099 cd	54 a	226	99	56349 bc	16190 c
27.5	9382 d	54 a	223	98	49603 c	14929 d
$LSD_{0.05}$	817	0.4861	ns	ns	15768	1086

2. Determination of optimum plant population of maize hybrid for ridge sowing (YH-5395)

This experiment was conducted with an objective to find out the optimum plant population for maize hybrid YH-5395 under ridge sowing method. Five plant spacing's were evaluated viz., 12.5, 15, 17.5, 20 and 22.5 cm on 75 cm apart ridges. Treatments were laid out in randomized complete block design and replicated thrice. Results of the experiments revealed that plants sown with 12.5 and 15 cm spacing reached to 50% plant spacing significantly earlier than rest of the treatments. Plant height remained unaffected of the treatments while ear height varied among the treatments. Plants sown at 17.5 cm bore ears at highest points on the stem and ear height decreased as plant spacing was either increased or decreased. Maximum ($P<0.05$) number of ears were obtained at 15 cm plant spacing followed by at 12.5 cm spacing. Highest fresh ear weight and grain yield was obtained at 15 cm plant spacing however it was statistically not different from 12.5cm plant spacing. Lowest fresh ear weight and grain yield was obtained from 22.5cm plant spacing. It may be concluded that hybrid YH-5395 should be planted at 15 cm plant spacing in Kharif season to attain maximum grain yield.

Table-35: Effect of different plant spacing on maize hybrid under ridge sowing method during Kharif-2020 at MMRI, Yusafwala

Treatments (cm)	Grain yield (kg ha^{-1})	Days to 50% Silking	Plant height (cm)	Ear Height (cm)	No. of ears ha^{-1}	Fresh ear weight (kg ha^{-1})
12.5	9205 a	54.7 a	212	85.7 b	73704 ab	15067 a
15	9658 a	53.7 ab	217	87.0 b	77037 a	15289 a
17.5	8632 b	53.3 b	213	90.7 a	68148 bc	14275 b
20	8592 b	53.3 b	212	90.3 a	68148 bc	13969 b
22.5	8117 c	53.0 b	208	84.7 b	66667 c	13294 c
$LSD_{0.05}$	452	1.00	ns	2.7393	6316.7	578.32

3. Determination of irrigation water requirement of hybrid maize under different planting methods

The trial was conducted in kharif-2020 to estimate the water requirements of hybrid maize under different sowing methods. Treatments consist of four sowing methods viz: 1) 75 cm spaced furrows 2) 120 cm spaced raised beds 3) 105 cm spaced raised beds 4) 90 cm spaced raised beds. Treatments were applied in RCBD with three replications. Hybrid YH-1898 was used in this experiment. During the season 52.2 mm effective rainfall was recorded. Irrigation water applied at each irrigation was measured through cut-throat flume. Results revealed in table show that days to 50% silking remained unaffected of the treatments. Plant height and ear height was maximum at 1.05 m wide beds while shortest plants and lowest ear height was recorded at 120 cm wide beds. Maximum number of ears was recorded at 90 cm wide beds. Maximum fresh ear weight and grain yield was obtained at 105 cm and 90 cm while minimum was recorded at 120 cm wide beds. Minimum amount of irrigation water (348 mm) was used in 105 cm wide beds while maximum amount (390 mm) was consumed by 90 cm wide beds. Greatest water use efficiency of 22.3 kg of grains ha^{-1} mm^{-1} was recorded by 105 cm wide beds while lowest WUE was obtained at 120 cm wide beds. It may be concluded that for greater water use efficiency and higher grain yield under irrigated conditions maize should be sown on both sides of 1.05 cm wide beds.

Table 36: Irrigation water requirement of hybrid maize under different sowing methods during kharif-2020 at MMRI, Yusafwala

Treatments (inches)	Days to 50% Silking	Plant height (cm)	Ear Height (cm)	No. of ears ha^{-1}	Fresh ear weight (kg ha^{-1})	Grain yield (kg ha^{-1})	water applied (mm)	Effective Rainfall (mm)	WUE (kg/ha /mm)
75 cm furrow	53.7	221	102	59911 a	13772 c	8383 b	374	52.2	19.7

90 cm wide beds	53.7	228	103	63087 a	14161 a	8873 a	390	52.2	20.1
105 cm wide beds	52.7	241	108	61623 a	14079 a	8935 a	348	52.2	22.3
120 cm wide beds	54.3	217	93	53695 b	12212 b	7675 c	365	52.2	18.4
$LSD_{0.05}$	ns	7.20	4.06	4039	1007	551			

4. Effect of sowing dates on grain yield of hybrids and OPV under changed climate scenario

The trial was conducted during Kharif 2020 with the objective of determination of optimum sowing time for different hybrids and OPV developed by the institute in Sahiwal under changed climate scenario. The layout of the trial was split plot design keeping sowing dates in main plots while genotypes were kept in sub plots with four replications, having plot size of 3m × 5m. The trial was sown using standard production technology. Results are depicted in table. The results revealed that plant population was more in 1st July sowing while other two sowing dates were statistically at par with each other. All the hybrids had greater plant population than OPV. Interaction of SD × V showed that early sowing of hybrids resulted in higher as compared to late sowing. Interactive effect (SD × V) was significant on plant height. Sahiwal-Gold had tallest plants at SD_1 while hybrids at all sowing dates had shorter plants than OPV. Interactive (SD × V) effect on ear height showed that YH-5427 at SD_1 bore ears at lowest point on stem while at SD_2 and SD_3 it had greater ear height compared to other genotypes. At SD_2 all genotypes had similar ear height. Hybrids YH-1898 and YH-5427 had greater fresh ear weight at all sowing dates while OPV produced least ear weight. Similar trend was observed in grain yield i.e., hybrids YH-1898 and YH-5427 produced higher grain yield at all sowing dates. While Sahiwal-Gold produced minimum grain yield at all sowing dates. It may be concluded that to attain higher grain yield maize hybrids YH-1898 and YH-5427 should be planted at 1st July.

Table 37: Effect of sowing dates on different plant attributes and grain yield of different hybrids and OPVs sown under different temperature regimes.

Treatments	Grain yield (Kg ha^{-1})	No. of plants ha^{-1}	Plant height (cm)	Ear height (cm)	Fresh ear weight (kg ha^{-1})
Sowing date					
SD_1 (1st July)	9347 A	74219 A	235 A	112 AB	12924 A
SD_2(15th July)	6272 B	49063 B	234 A	114 A	10406 AB
SD_3 (30th July)	6004 B	41094 B	207 A	101 B	1017 B
LSD0.05	374.5	10427	31.074	11.3	3386
Varieties					
V_1 (YH1898)	8219 A	62708 A	215 B	100	12416 A
V_2 (YH5427)	7538 B	58125 A	230 AB	119	10632 A
V_3 (FH-1046)	7313 B	56667 A	220 AB	104	10563 A
V_4 (SWL-Gold)	5758 C	41667 B	236 A	115	8390 B
LSD0.05	414.80	7988.2	18.4	ns	1992.4
Interaction (SD × V)					
$SD_1 \times V_1$	10296 A	83125 A	227 B	108 ABC	15394 A
$SD_1 \times V_2$	10296 A	74375 AB	216 B	97 BC	1273 AB

$SD_1 \times V_3$	9486 B	75000 AB	227 B	111 ABC	1292 AB
$SD_1 \times V_4$	7815 C	64375 BC	267 A	133 AB	10643 B
$SD_2 \times V_1$	7329 CD	44375 E	208 B	103 ABC	9976 B
$SD_2 \times V_2$	7329 CD	45625 DE	189 B	138 A	9533 B
$SD_2 \times V_3$	6885 DE	54375 CDE	214 B	107 ABC	9216 B
$SD_2 \times V_4$	6428 EF	20000 F	217 B	110 ABC	3959 C
$SD_3 \times V_1$	6026 F	60625BCD	210 B	89 C	11878 AB
$SD_3 \times V_2$	5939 F	54375CDE	286 A	121 ABC	9633 B
$SD_3 \times V_3$	4740 G	40625 E	218 B	94 C	9544 B
$SD_3 \times V_4$	4721 G	40625 E	224 B	102 ABC	10569 B
LSD0.05	718	13836	31.8	42.7	3451

5. Determination of silage production potential of different hybrids and OPVs in different cropping systems of Punjab

The trial was sown to determine the silage production potential of different hybrids and OPVs of maize recently released by MMRI in different agro-ecological zones and cropping systems of the Punjab. For this purpose four locations viz: 1) Maize & Millets Research Institute, Yousafwala Sahiwal, 2) Rice Research Institute, Kala Shah Kaku, 3) Fodder Research Institute Sargodha and 4) Maize Research Sub Station Faisalabad. At each location trials were laid out in RCBD having three replication and plot size 20 m × 40 m were sown during last week of April 2020. Standard uniform agronomic practices were adopted for growing crop. After 65 days of sowing data regarding total biomass production per hectare and grain filling percentage were recorded and analyzed statistically. The results presented in table-38a & 38b revealed that Maximum biomass was produced by hybrid YH-1898 (75.0 t ha^{-1}) followed by YH-5427(69.5 t ha^{-1}), Sahiwal-Gold (66.88 t ha^{-1}) and Gohar-19 (65.7 t ha^{-1}). Maximum tonnage of biomass was produced at MMRI-Yusafwala across all locations followed by RRI, KSK. Lowest biomass was produced by Gohar-19 at all locations except at FRI, Sargodha where SWL-Gold produced lowest biomass. The grain filling capacity of a genotype decides the maximum biomass as well as the quality of silage. Maximum grain filling percentage of ears were in hybrid YH-5427 (82.5) followed by hybrid YH-1898 (62.5%), Sahiwal-Gold (26.3%) and Gohar-19 (16.3%). Hybrids were more efficient for grain filling compared to OPVs under stressed conditions. As for as locations are concerned at MMRI the grain filling was maximum (55%), the other three locations were noted with low ear filling percentage statistically at par with each other. It may be concluded that to achieve higher biomass yield at YH-1898 should be used for biomass (silage) production.

Table 38a: Effect of sowing dates on biomass production potential of different hybrids and OPVs at different agro-ecological locations after in different cropping systems

Location Name	**Biomass yield (t ha^{-1})**					
	SWL-Gold	**Gohar-19**	**YH-1898**	**YH-5427**	**Total**	**Average**
MMRI (Yousafwala)	77.5	75.0	89.2	78.3	320	80.0 A
RRI (Kala Shah Kaku)	70.2	67.5	72.7	74.0	284.4	71.1 B
FRI (Sargodha)	53.7	60.2	68.2	63.3	245.2	61.3 C
MRS (Faisalabad)	66.0	60.0	70.0	62.5	258.4	64.6 C
Average	66.8 B	65.7 B	75.0 A	69.5 B		
LSD 0.05 for Varieties	4.008	CV=8.23	LSD for Locations =6.4			

Table 38b: Effect of sowing dates on grain filling percentage of different hybrids and OPVs at different agro-ecological locations after in different cropping systems

Location Name	Grain filling (%)					
	SWL-Gold	Gohar-19	YH-1898	YH-5427	Total	Average
MMRI (Yousafwala)	30	20	80.0	90.0	320	55.0 A
RRI (KSK)	30	10.0	50.0	80.0	284	42.5 C
FRI (Sargodha)	25	15.0	50.0	75.0	245	41.3 C
MRS (Faisalabad)	20	20.0	70.0	85.0	258	48.8 B
Average	26.3 C	16.3 D	62.5 B	82.5 A		
LSD 0.05	6.2	CV=10.9 LSD for Locations =5.15				

6. Evaluation of different weedicides for weed control in pearl millet

During Kharif 2020 different pre and post emergence herbicides were evaluated for effective weed control in pearl millet. Treatments were applied in RCBD, replicated thrice. Results showed that the highest grain yield of 3133.33 kg/ha was harvested from the plots where metolachlor (83%) + pendimethaline (13%) was sprayed @ 300ml/ac as pre emergence herbicide along with application of mesotrione (5%) + atrazine (50%) as post emergence herbicide @ 250 ml/acre. It was followed by sole application of either pre or post emergence herbicides. Whereas the lowest grain (1250 kg/ha) was recorded in the control treatment where no herbicide application was made.

Table 39: Effect of different herbicides on pearl millet grain yield in kharif-2020 at MMRI

Treatments	Brand Name and AI	Dose /acre (ml)	Grain Yield (kg ha^{-1})
Pre-Emergence	(Top Max 96% EC) (Metoloachlor 83% + Pendimethaline 13%)	300	2389 bcd
Pre-Emergence	(Top Max 96% EC) (Metoloachlor 83% + Pendimethaline 13%)	450	2456 bcd
Pre-Emergence	(Click 72.4% SE) (Acetochlor 54.4% + atrazine 18%)	250	2622 ab
Pre-Emergence	(Click 72.4% SE) (Acetochlor 54.4% + atrazine 18%)	375	1900 cd
Pre-Emergence	(Voltril 63% SE) (S. metolachlor 32% + atrazine 28.5% + Mezotrione 2.5%)	500	1856 de
Post-Emergence	(Flisto Gold 550 SC) (Mesotrione 5% + Atrazine 50%)	250	2656 ab
Post-Emergence	(Flisto Gold 550 SC) (Mesotrione 5% + Atrazine 50%)	300	2500 bc
Post-Emergence	(Flisto Gold 550 SC) (Mesotrione 5% + Atrazine 50%)	350	2189 bcd
Post-Emergence	(Primextra Gold 720 SC) (S. metolachlor 35.4% + Atrazine 28.3%)	250	2778 ab
Post-Emergence	(Primextra Gold 720 SC) (S. metolachlor 35.4% + Atrazine 28.3%)	300	2578 ab
Control (no	-		1250 e

weeding)			
Pre-emergence + Post-Emergence	(Top Max 96%) + (Flisto Gold 550 SC)	300 + 250	3133 a

7. Evaluation of different weedicides for weed control in sorghum

During Kharif 2020 various herbicides were evaluated for better weed control in sorghum crop. Treatments were applied in RCBD, replicated thrice. Control plot with no herbicide application was maintained for comparison. Data revealed that maximum grain yield of 2316.11 kg/ha was achieved with the treatment in which pre-emergence application of metolachlor (83%) + pedimethaline (13%) was made @ 300 ml/ac along with spray of mesotrione (5%) + atrazine (50%) at post emergence stage @ 250 ml/ac that was followed by post emergence application of mesotrione (5%) + atrazine (50%) @ 300 ml/ac that yielded 2224.24 kg/ha grains. While the lowest grain yield was recorded with the control treatment that gave 1117 kg/ha

Table 40: Effect of different herbicides on sorghum grain yield in kharif-2020 at MMRI

Treatments	Brand Name and AI	Dose /acre (ml)	Grain Yield (kg ha-1)
Pre-Emergence	(Top Max 96% EC) (Metoloachlor 83% + Pendimethaline 13%)	300 ml	1589 de
Pre-Emergence	(Top Max 96% EC) (Metoloachlor 83% + Pendimethaline 13%)	450	1751 cde
Pre-Emergence	(Click 72.4% SE) (Acetochlor 54.4% + atrazine 18%)	250	1839 bcde
Pre-Emergence	(Click 72.4% SE) (Acetochlor 54.4% + atrazine 18%)	375	2022 abcd
Pre-Emergence	(Voltril 63% SE) (S. metolachlor 32% + atrazine 28.5% + Mezotrione 2.5%)	500	1489 ef
Post-Emergence	(Flisto Gold 550 SC) (Mesotrione 5% + Atrazine 50%)	250	2067 abc
Post-Emergence	(Flisto Gold 550 SC) (Mesotrione 5% + Atrazine 50%)	300	2244 ab
Post-Emergence	(Flisto Gold 550 SC) (Mesotrione 5% + Atrazine 50%)	350	1917 bcde
Post-Emergence	(Primextra Gold 720 SC) (S. metolachlor 35.4% + Atrazine 28.3%)	250	2022 abcd
Post-Emergence	(Primextra Gold 720 SC) (S. metolachlor 35.4% + Atrazine 28.3%)	300	1750 cde
Control (no	-		1117 e

weeding)			
Pre-emergence + Post-Emergence	(Top Max 96%) + (Flisto Gold 550 SC)	300 + 250	2361 a
LSD			439

SPRING 2021

1. Determination of optimum plant population for hybrid maize (yh-5427) in bed sowing in spring season

This experiment was conducted to find out the feasibility of increasing yield by increasing number of plants on 1.05 m wide bed sowing in spring season. Treatments comprised of five planting density viz. 35000, 38000, 41000, 44000 and 47000 plants acre^{-1}. Treatments were laid out in randomized block design replicated thrice. Sowing was done on both sides of the bed top. Results revealed that maximum fresh ear weight and grain yield was obtained from 44000 plants acre^{-1} that were statistically not different from that obtained from 41000 and 38000 plants acre^{-1}. While minimum fresh ear yield and grain yield was obtained from 35000 and 47000 plants acre^{-1}.

Table 41: Effect of high plant density on grain yield of hybrid maize on 1.06 cm wide beds during spring-2021 at MMRI Yusafwala

Treatment (plants acre^{-1})	Grain yield (kg ha^{-1})	Fresh ear yield (kg ha^{-1})
35000	13197 b	19101 b
38000	14132 a	20375 a
41000	14310 a	20627 a
44000	14585 a	20797 a
47000	12915 b	18587 b
LSD0.05	847	1159

2. Determination of optimum plant spacing of hybrid maize on ridge sowing

The objective of the trial was to find out the suitable plant spacing under ridge-furrow sowing method for newly developed maize hybrid FH-1210 in spring season. Five plant spacing were evaluated viz 12.5, 15, 17.5, 20 and 22.5 cm. Treatments were laid out in randomized complete block design and replicated thrice. Results shown in table suggest that maximum fresh ear weight was obtained from 6 inch plant space that was statistically not different from 5, 7 and 8 inch plant spacing. Similarly highest grain yield was obtained from 7 inch plant spacing that was statistically not different from 5 and 6 inch spacing. Lowest fresh ear weight and grain yield as recorded at 9 plant spacing.

Table 42: Effect of plant spacing on maize yield sown on 75 cm wide ridges yield during Spring-2021 at MMRI Yusafwala

Plant spacing (cm)	Grain yield (kg ha^{-1})	Fresh ear yield (kg ha^{-1})
12.5	11245 AB	14933 A
15	11470 AB	15474 A
17.5	11805 A	15472 A
20	10951 BC	14869 A
22.5	10540 C	14005 B
$LSD_{0.05}$	689	818

3. Compensation of poor germination and plant losses in maize through transplantation

This study is being conducted with an objective to explore the option of transplanted maize in maintaining the required plant population in case of sub-optimal plant stands. Treatments consist of four age of nursery at the time of transplanting viz: 1) control (No transplanting), 2) Gap filling by transplantation (Germination trays established 3 days prior to field sowing 3) Gap filling by transplantation (Germination trays established 2 days prior to field sowing 4) Gap filling by transplantation (Germination trays established 1 days prior to field sowing 5) Gap filling by transplantation (Germination trays established on the day of field sowing). Treatments having net plot size of 3.15 m × 5 m were laid out in RCBD with three replications. Maize hybrid YH-5427 was used in this experiment. Sowing was done on 1.05 m wide beds. Field experiment was sown on 15-02-2021 while transplanting was done on 01-03-2021. Results of this trial depicted in table reveal that though yield increased by all transplanting treatments over control but none was statistically different from control term.

Table 43: Effect of maize transplanting on fresh ear yield and grain yield of hybrids at MMRI Yusafwala during spring-2021

Treatment	Grain yield (kg ha^{-1})	Fresh ear yield (kg ha^{-1})
Same day nursery	13030	18493
one day before	12792	18187
two day before	12582	17975
3 day before	12538	17957
No transplanting	12199	17600
$LSD_{0.05}$	1390	1886

4. Mix sowing evaluation of maize hybrids in spring season

The objective of the study was to utilize genetic diversity leading to enhanced crop production. Treatments consist of 1) sole crop of YH-5568 2) Sole crop of YH-5427 3) Blended seed sowing of YH-5568 and YH-5427 4) alternative rows of YH-5568 and YH-5427 5) Two row strip cropping of YH-5568 and YH-5427. Sowing was done on 1.05 m wide beds. Treatments having net plot size of 3.15 m × 5 m were laid out in RCBD with three replications. Results (Table 44) reveal that statistically maximum ($P<0.05$) fresh ear weight was obtained when both hybrids were sown in two row strips. There was no difference among all other treatments. Similarly maximum grain yield was recorded from two row strip mix sowing however it was statistically not different from sole crop of YH-5582. All other treatments produced similar but lower grain yield.

Table 44: Effect of mix sowing of hybrids on maize yield during spring-2021 at MMRI Yusafwala

Treatment (plants acre^{-1})	Grain yield (kg ha^{-1})	Fresh ear yield (kg ha^{-1})
Sole crop A (YH-5568)	13183 ab	18117 b
Sole crop B (YH-5427)	12390 b	17535 b
Blended sowing (A+B)	12300 b	17178 b
Alternative rows (A & B)	12566 b	17991 b
Two row strips (A & B)	13843 a	19759 a
$LSD_{0.05}$	950	1515

5. Effect of sowing dates on grain yield of hybrids and OPV under changed climate scenario.

The trial was conducted with the objective to determine the optimum sowing time under changed climate of different hybrids and OPVs of MMRI. Treatments comprised of 5 sowing dates from 20th January to 10th April with an interval of 20 days. Five genotypes including four hybrids one from multinational and one OPV Sahiwal-gold were sown at each respective sowing time. Trial was laid out in factorial design with split plot arrangement having three replications. The net plot size was 3m × 5 m. Data are being recorded and results will be compiled later on.

6. Determination of silage production potential of different hybrids and OPVS in different cropping systems of Punjab

The trial was sown to determine the silage production potential; of different hybrids and OPVs of maize recently released by MMRI in different agro-ecological zones and in different cropping systems of the Punjab. For this purpose four locations were selected with different agro-ecological condition with different cropping system viz: 1) Maize & Millets Research Institute, Yousafwala Sahiwal, 2) Rice Research Institute Kala Shah Kaku, 3) Fodder Research Institute Sargodha and 4) Maize Research Sub Station Faisalabad. At each location trials having three replications with RCBD fashion and plot size 20m × 40m were sown during last week of April 2021.Standard uniform agronomic practices were adopted for growing crop. Trials were harvested after 65 days of sowing to record total biomass production and grain filling. Data is being recorded and analyzed statistically.

PLANT PATHOLOGY:

KHARIF 2020:

1- Testing of Stalk Rot Intensity in Maize Hybrids by Artificial Inoculation

The experiment comprised of ten maize hybrids i.e. YH-5749, YH-5849, YH-5632-1, YH-5632-3, YH-5852, YH-5761-2, YH-5855, YH-5732, YH-5876 and YH-5875.The experiment was conducted according to RCBD in two replications. Plot size was kept 4m × 1.5m. It was sown on 19-08-2020. At silking stage 5 plants were inoculated with self-prepared tooth picks of fungus *Fusarium moniliforme*. After one month of inoculation, each inoculated plant was torn apart by a scalpel and disease reaction was recorded and graded with the help of Hooker's disease rating scale. The data were recorded and presented in the following table

Table: 45. Results of Stalk Rot Intensity in Maize Hybrids by Artificial Inoculation

Name of maize hybrids	Infection %age of inoculated internode	Hooker"s disease rating scale	Reaction
---	1-25	1	Highly Resistant
---	26-50	2	Resistant
YH-5849,YH-5632-3,YH-5852,YH-5761-2, YH-5855, YH-5732, YH-5875	51-75	3	Moderately Resistant
YH-5749, YH-5632-1, YH-5876	76-100	4	Moderately Susceptible

The data revealed that maize hybrids YH-5849, YH-5632-3, YH-5852, YH-5761-2, YH-5855, YH-5732, YH-YH-5875 are found moderately resistant and YH-5749, YH-5632-1, YH-5876 are found moderately susceptible against stalk rot of maize.

2- Testing of Different Fungicides against Stalk Rot by Treating the Soil at Their Double Doses On (Maize Hybrid=YH-5948).

The experiment comprised of six treatments i.e. Topsin M 70WP, Hombre Excel 37.25 FS, Score 250SC, Emesto 24FS, Nativo 75WG and control. It was conducted according to RCBD with plot size 4m × 2.25m in four replications. It was sown on 19-08-2020.Data regarding plant stand count (PSC), plants harvested (PH), stalk rot infection (SRI), stalk rot infection reduction (SRIR) %age and grain yield (GY) were recorded which are presented in table

Table 46. Results of Different Fungicides against Stalk Rot.

Sr. No	Treatments	GY (kg/ha)	PSC	PH	SRI %age	SRIR %age
1	**Topsin M 70WP**	8022	45	45	0.59	94.19
2	**Hombre Excel 37.25 FS**	7611	43	42	1.77	81.43
3	**Nativo 75WG**	7488	41	40	1.92	81.24
4	**Emesto 24FS**	7299	42	41	2.52	72.99
5	**Score 250SC**	7133	43	42	3.24	62.87
6	**Control**	6577	39	38	9.37	0.00
	CV	4.05	11.13	11.47	68.85	32.41
	LSD@5%	0.40	7.12	7.20	3.36	31.97

The data revealed that Topsin M 70WP showed the best control against stalk rot expressing minimum stalk rot infection %age (0.59%) and stalk rot infection reduction %age (94.19%) with grain yield 8022 kg/ha followed by Hombre Excel 37.25 FS expressing stalk rot infection %age (1.77%) and stalk rot infection reduction %age (81.43%) with grain yield 7611 kg/ha.

3- Screening of Different Maize Germplasm against Stalk Rot (*Fusarium moniliforme*).

The maize germplasm and hybrids of demonstration trial planted within institute during Autumn-2020 were artificially inoculated at silking stage with stalk rot pathogen with the help of infected tooth picks method at second internodes from soil level of plants. After one month of inoculation disease intensity was recorded and graded with the help of Hooker's disease rating scale (1-10). Following number of 13 hybrids of demonstration trial and 636 maize germplasm were screened out against stalk rot. The data is presented in table below

Table: 47. Screening of Different Germplasm and Hybrids against Stalk Rot during Autumn-2020

Reaction/Scale	Demonstration trials	EIB Lines	PEIB Lines	Derivations
No of plots	13	277	31	328
Highly Resistant	00	00	00	00
Resistant	00	01	00	00
Moderately Resistant	03	114	14	96
Moderately Susceptible	10	137	17	228
Susceptible	00	20	00	04
Highly Susceptible	00	05	00	00

The data revealed that in demonstration trials, no hybrid was found highly resistant, or resistant, 03 hybrids were found moderately resistant, 10 hybrids were found moderately susceptible, no hybrid was found susceptible and no hybrid was found highly susceptible.

In elite inbred lines, no line was found highly resistant, 01 line was found resistant, 114 lines were found moderately resistant, 137 lines were found moderately susceptible, 20 lines were found susceptible, 05 lines were found highly susceptible.

In pre-elite inbred lines, no line was found highly resistant, no line was found resistant, 14 lines were found moderately resistant, 17 lines were found moderately susceptible, no line was found susceptible and no line was found highly susceptible.

In derivations, no family was found highly resistant, no family was found resistant, 96 families were found moderately resistant, 228 families were found moderately susceptible, 04 four families were found susceptible, no family was found highly susceptible

SPRING 2021:

1-Testing of Stalk Rot Intensity in Maize Hybrids by Artificial Inoculation

The experiment comprised of ten single cross maize hybrids i.e. YH-5482, YH-5568, YH-5569, YH-5958, YH-5960, YH-5974, YH-6038, YH-6039, YH-6043 and YH-6044. It was conducted according to RCBD in two replications. Plot size was kept 4m×1.5m.It was sown on 19-02-2021. At silking stage, 5plants/plot was inoculated with self-prepared tooth picks of fungus *Fusarium moniliforme.* After one month of inoculation, each inoculated plant was torn apart by a scalpel and disease reaction was recorded with the help of Hooker's disease rating scale. The data were recorded and is presented in the following table

Table: 48. Results of stalk rot intensity in maize hybrids by artificial inoculation.

Names of maize hybrids	Infection %age of inoculated internode	Hooker's disease rating scale	Reaction
---	1-25	1	Highly Resistant
---	26-50	2	Resistant
YH-5482, YH-5960, YH-5974, YH-6039, YH-6043, YH-6044	51-75	3	Moderately Resistant
YH-5568, YH-5569, YH-5958,YH-6038	76-100	4	Moderately susceptible

The data revealed that maize hybrids YH-5482, YH-5960, YH-5974, YH-6039, YH-6043, YH-6044 were found moderately resistant and maize hybrids YH-5568, YH-5569, YH-5958 and YH-6038 moderately susceptible against stalk rot of maize.

2-Testing of Different Fungicides against Stalk Rot of Maize by Treating the Soil at their Double Doses on (Hybrid=5679).

The trial comprised of six treatments i.e. Topsin-M 70WP, Hombre Excel, Score 250SC, Emesto 24FS, Nativo 75WG and Control. It was conducted according to RCBD with plot size 4m × 2.25m in four replications. It was sown on 19-02-2021.Data regarding stand count, plants harvested, stalk rot infection %age, stalk rot infection reduction %age and grain yield were recorded which are presented below in the table.

Table:49. Results of different fungicides against stalk rot

Sr. No	Treatments	Stand count	Plants harvested	Stalk rot infection %age	Stalk rot infection reduction %age	Grain Yield (kg/ha)
1	**Topsin-M 70WP**	60	58	3.1	75.5	8288
2	**Hombre Excel 372.5FS**	60	58	5.6	57.9	8033
3	**Nativo 75WG**	69	58	5.6	56.8	7955
4	**Emesto 24FS**	60	58	5.5	56.3	7733
5	**Score 250SC**	60	59	6.3	48.8	7533
6	**Control**	59	58	12.9	0.00	6899
	CV %age	0.34	2.75	24.75	21.67	6.12
	LSD @ 5%	0.30	2.42	2.42	16.07	716

The data revealed that Topsin-M 70WP showed the best control against stalk rot expressing minimum stalk rot infection %age (3.1) and stalk rot infection reduction %age (75.5) with grain yield 8288 kg/ha followed by Emesto 24FS expressing stalk rot infection %age (5.5) and stalk rot infection reduction %age (56.3) with grain yield 7733 kg/ha.

3-Screening of Different Maize Germplasm and Hybrids against Stalk Rot.

The maize germplasm and hybrids of PYT and MPMYT planted within institute were artificially inoculated at silking stage with stalk rot pathogen with the help of infected tooth picks at second internodes from soil level of plants. After one month of inoculation, disease intensity was

recorded with the help of Hooker's disease rating scale (1-10).Following number of 387 maize germplasm and 326 hybrids of PYT 1-PYT 7 and MPMYT1-MPMYT 4 were screened out against stalk rot.

Table: 50. Screening of different maize germplasm and hybrids against stalk rot

Reaction/Scale	EIB Lines	PEIB Lines	Derivations	PYT 1-PYT 7	MPMYT 1-MPMYT 7
No of plots	194	32	161	156	170
Highly Resistant	0	0	0	0	0
Resistant	0	0	0	0	0
Moderately Resistant	63	14	45	92	88
Moderately Susceptible	131	18	116	64	82
Susceptible	0	0	0	0	0
Highly Susceptible	0	0	0	0	0

The data revealed that in EIB Lines, no line was highly resistant, or resistant, 63 lines were found moderately resistant, 131 lines were found moderately susceptible, no line was found susceptible and no line was found highly susceptible.

In Pre Elite Inbred Lines (PEIB), no line was found highly resistant, no line was found resistant, 14 lines were found moderately resistant, 18 lines were found moderately susceptible, no line was found susceptible and no line was found highly susceptible.

In Derivations, no family was found highly resistant, or resistant, 45 families were found moderately resistant,116 families were found moderately susceptible, no family was found susceptible and no family was found highly susceptible

In Preliminary yield trials PYT 1-PYT 7, or highly resistant, no hybrid was found resistant, 92 hybrids were found moderately resistant, 64 hybrids were found moderately susceptible, no hybrid was found susceptible and no hybrid was found highly susceptible

In MPMYT 1-MPMYT 4, no Hybrid was found highly resistant, no hybrid was found resistant, 88 hybrids were found moderately resistant, 82 hybrids were found moderately susceptible, no hybrid was found susceptible and no hybrid was found highly susceptible.

4-Screening of Maize Hybrid FH-1210 against Stalk Rot y artificial Inoculation

The stalk rot infected plants were split at second internodes for the observation of disease reaction. Following disease reaction was observed in maize hybrid FH-1210 and rated according to Hooker's disease rating scale. The degree of resistance and susceptibility is given below in the table

Table: 51. The degree of resistance and susceptibility in maize hybrid FH-1210

Name of maize hybrid	Infection %age of inoculated internode	Scale	Reaction
----	1-25	1	Highly Resistant

----	26-50	2	Resistant
FH-1210	51-75	3	Moderately Resistant
----	76-100	4	Moderately Susceptible

The data in table revealed that maize hybrid FH-1210 is found moderately resistant against stalk rot of maize.

ENTOMOLOGY
KHARIF 2020

1- Testing of Different Sprayable Insecticides against Shootfly and Corn Aphid on Maize Hybrid YH-5948

The trial comprised of five treatments i.e. Commando 75SP, Commando plus 97DF, Confidor 20SL, Actara 25WG and Control. It was conducted according to RCBD with plot size 4m × 2.25m in four replications. It was sown on 19-08-2020. Pre-treatment (before spray) data of shootfly infestation %age, shootfly infestation %age after 72 hours and 7 days of treatment (after spray) along with plant stand count and grain yield were recorded. No corn aphid attack was observed on the crop. The data were compiled and analyzed which are presented in table below

Table: 52. Results of different Sprayable insecticides against shootfly and corn aphid

Sr. No.	Treatments	GY(Kg /ha)	PSC	SFI %age before spray	SFI %age 72 Hrs	SFI %age 7DAA
1	**Commando plus 97DF**	8163	42	3.27	3.27	0.67
2	**Commando 75SP**	7455	45	4.35	3.77	1.04
3	**Actara 25WG**	7205	43	4.45	3.35	1.67
4	**Confidor 20SL**	7030	45	2.91	2.27	1.77
5	**Control**	6519	45	4.22	5.85	7.18
	CV %age	3.80	10.02	25.79	23.30	27.07
	LSD@5%	426	15.48	1.62	1.33	1.03

PSC: Plant stand count, SFI: Shoot fly infestation and GY: Grain Yield.

The data revealed that Commando plus 97DF showed the best control against shootfly expressing minimum shootfly infestation %age (0.67 %) with grain yield 8163 kg/ha followed by Commando 75SP expressing shootfly infestation %age (1.04 %) with grain yield 7455 kg/ha.

2- To Evaluate the Efficacy of Double Dose of Different Insecticides against *Helicoverpa Zea* by Soil Application on maize hybrid YH-5948

The experiment comprised of five treatments i.e. Chlorpyrifos 40EC, Bifenthrin 10EC, Bolten 31EC, Radiant 120SC and control. It was conducted according to RCBD with plot size 4m×2.25m with four replications. It was sown on 19-08-2020.Data regarding plant stand count (PSC), *Helicoverpazea infestation* %age, *Helicover pazea* infestation reduction (HZIR)%age and grain yield (GY) were recorded which are presented in table below

Table: 53. Results of Different Insecticides against *Helicoverpazea*

Sr.No.	Treatments	GY (Kg/ha)	PSC	HZI %age	HZIR %age
1	**Chlorpyrifos**	9311	46	12.02	64.13

	40EC				
2	**Bolten 31EC**	9133	40	14.55	58.57
3	**Bifenthrin 10EC**	8577	38	23.98	34.74
4	**Radiant 120SC**	8366	43	23.62	31.73
5	**Control**	7633	46	35.13	0.00
	CV	3.54	11.21	32.91	50.09
	LSD@5%	0.42	7.42	11.08	29.20

The data revealed that Chlorpyrifos 40EC showed the best control against *Helicoverpazea* expressing minimum *Helicoverpazea*infestation (12.02%) with grain yield 9311 kg/ha followed by Bolten 31EC expressing *Helicoverpazea*infestation (14.55%) with grain yield 9133 kg/ha.

SPRING 2021:

1- Testing of Different Sprayable Insecticides against Shoot fly and Corn Aphid (Hybrid=YH-5679)

The trial comprised of five treatments i.e. Commando 75SP, Commando Plus 97DF, Confidor 20SL, Actara 25WG and Control. It was conducted according to RCBD with plot size 4m × 2.25m in four replications. It was sown on 19-02-2021.Pre-treatment(before spray) data of shootfly %age, shootfly infestation %age after 72 hours and 7 days of treatments(after spray),stand count and grain yield were recorded. No attack of corn aphid was observed on the crop. The data were compiled and analyzed which are presented in table below

Table: 54. Results of different Sprayable insecticides against shootfly

Sr. No	Treatments	Grain Yield (Kg/ha)	Stand count	Shootfly infestation %age before spray	Shootfly infestation %age 72 HAA	Shootfly infestation %age 7 DAA
1	**Commando Plus 97DF**	7555	33	12.3	2.5	0.00
2	**Commando 75SP**	6999	43	9.4	1.7	1.00
3	**Actara 25W**	6666	43	10.8	2.8	1.2
4	**Confidor 20SL**	6111	40	12.6	7.1	3.9
5	**Control**	5777	42	12.1	15.1	17.00
	CV %age	9.63	11.5	45.4	59.05	74.45
	LSD@5%	981	7.2	8.01	5.32	5.29

The data in table revealed that Commando Plus 97DF showed the best control against shootfly expressing minimum shootfly infestation %age(0.00) with grain yield 7555 kg/ha followed by Commando 75SP expressing shootfly infestation %age (1.00) with grain yield 6999 kg/ha.

2- Testing of Different Sprayable Insecticides against Shootfly (*Atherigona Soccata*) and Black Bug (*Cavelerius Excavates*) on (Hybrid=5679).

No attack of shootfly and black bug was observed on the crop until the harvesting of the trial.

3- Testing of Different Sprayable Insecticides against Stem Borer (*Chilo Partellus*), Army Worm (*Spodoptera Spp*) and Ear worm *Helicoverpa Zea* on (Hybrid=5679).

The trial comprised of five treatments i.e. RockroleXtra 40WG, Voliam Flexi 300SC, Coragen 20SC, Radiant 120SC and Control. It was conducted according to RCBD with plot size 4m

× 2.25m in four replications. It was sown on 19-02-2021.pre-treatment (before spray) data of Stem borer %age, Army worm infestation %age, *Helicoverpazea*infestation %age, Stem borer infestation %age, Army worm infestation %age, *Helicoverpazea*infestation %age after 72 hours and 7 days of treatments(after spray), stand count and grain yield were recorded. The data were compiled and analyzed which are presented in tables below

Table: 55. Results of different Sprayable insecticides against Stem borer

Sr.No	Treatments	Grain yield (kg/ha)	Stand count	Borer infestation %age before spray	Borer infestation %age 72 HAA	Borer infestation %age 7 DAA
1	**Coragen 20SC**	9888	57	10.4	6.1	0.5
2	**Voliam Flexi 300SC**	9444	54	11.2	5.6	1.4
3	**RockroleXtra 40WG**	8999	57	9.2	5.6	2.1
4	**Radiant 120SC**	8777	57	11.7	7.0	2.2
5	**Control**	7888	53	8.9	11.3	13.6
	CV %age	5.29	4.47	17.27	27.44	34.48
	LSD@5%	731	3.84	2.73	3.00	2.09

The data in table revealed that Coragen 20SC showed the best control against stem borer expressing minimum borer infestation %age (0.5) with grain yield 9888 kg/ha followed by Voliam Flexi 300SC expressing borer infestation %age (1.4) with grain yield 9444 kg/ha.

Table: 56 Results of different Sprayable insecticides against Army worm.

Sr. No	Treatments	Army worm infestation %age before spray	Army worm infestation %age 72 HAA	Army worm infestation %age 7 DAA
1	**Voliam Flexi 300SC**	2.75	0.41	0.00
2	**Coragen 20SC**	1.72	0.41	0.00
3	**RockroleXtra 40WG**	3.39	1.27	0.42
4	**Radiant 120SC**	6.98	3.04	1.27
5	**Control**	7.5	9.38	12.19
	CV %age	66.74	34.87	22.05
	LSD@5%	4.59	1.56	0.94

The data in table revealed that Voliam Flexi 300SC and Coragen 20SC showed the best control against army worm expressing minimum army worm infestation %age (0, 0) respectively followed by RockroleXtra 40WG expressing army worm infestation %age (0.42).

Table: 57 Results of different insecticides against ear worm *Helicoverpazea.*

Sr. No	Treatments	*Helicoverpazea*infestation %age before spray	*Helicoverpazea*infestation %age 72 HAA	*Helicoverpazea* infestation %age 7 DAA
1	**Radiant 120SC**	4.74	3.88	2.14

2	**Coragen 20SC**	4.31	3.89	2.14
3	**RockroleXtra 40WG**	6.13	4.79	2.61
4	**Voliam Flexi 300SC**	5.55	4.65	2.80
5	**Control**	7.99	9.87	11.74
	CV %age	26.51	20.89	27.72
	LSD @5%	2.34	1.74	1.83

The data in table revealed that Radiant 120SC and Coragen 20SC showed the best control against *Helicoverpazea* expressing minimum *Helicoverpazea*infestation %age (2.14, 2.14) followed by RockroleXtra 40WG expressing *Helicoverpazea* infestation %age (2.61).

4- To Evaluate the Efficacy of Different Sprayable Insecticides against FAW *Spodoptera Frugiperda*on (Hybrid=5679).

The trial comprised of six treatments i.e. Vayego 200SC, Coragen 20SC, Runner 120EC, Belt 48SC, Emamectin Benzoate 1.9EC and Control. It was conducted according to RCBD with plot size 4m × 2.25m with four replications. It was sown on 19-02-2021.Pre-treatment(before spray) data of fall army worm infestation %age, fall army worm infestation %age after 72 hours and 7 days of treatments (after spray), stand count and grain yield were recorded. The data were compiled and analyzed which are presented in table below

Table: 58. Results of different insecticides against fall army worm *Spodoptera frugiperda*.

Sr.No	Treatments	Grain Yield (kg/ha)	Stand count	% FAW before spray	% FAW 72 HAA	% FAW 7 DAA
1	**Vayego 200SC**	10011	60	15.00	6.25	2.50
2	**Coragen 20SC**	9699	59	16.03	7.58	2.94
3	**Runner 120EC**	9355	60	17.50	7.91	3.75
4	**Belt 48SC**	9033	59	14.36	7.19	3.37
5	**Emamectin Benzoate 1.9EC**	8888	58	19.63	10.69	6.02
6	**Control**	8688	59	18.44	20.12	22.63
	CV %age	6.04	2.46	28.31	37.27	48.37
	LSD@5%	844	2.20	7.17	5.59	5.00

The data in table revealed that Vayego 200SC showed the best control against fall army worm expressing minimum FAW infestation %age (2.50) with grain yield 10011 kg/ha followed by Coragen 20SC expressing FAW infestation %age (2.94).

5- Testing of Different Seed Dressing Vs Sprayable Insecticides against *Spodoptera Frugiperda,* Other *Spodoptera Spp* and *Chilo Partellus*on (Hybrid=Dekalb 6317).

The trial comprised of five treatments i.e Reatis 480FS, Coragen 20SC, Radiant 120SC, Emamectin Benzoate 1.9EC and Control. It was conducted according to RCBD with plot size 4m × 2.25m in four replications. It was sown on 05-04-2021.pre-treatment (before spray) data of FAW infestation %age, Army worm infestation %age, stem borer infestation %age, FAW infestation %age, Army worm infestation %age, stem borer infestation %age after 72 hours and 7 days of

treatments(after spray), stand count were recorded. The data were compiled and analyzed which are presented in tables 59, 59.1, 59.2.

Table: 59. Results of different insecticides against FAW

Sr. No	Treatments	Stand count	% FAW before spray	% FAW 72 HAA	% FAW 7DAA
1	Coragen 20SC	59	2.09	0.42	0.00
2	Radiant 120SC	60	2.92	1.67	0.00
3	Emamectin Benzoate 1.9EC	59	6.28	2.92	1.25
4	Reatis 480FS	58	3.79	3.37	3.37
5	Control	51	1.69	8.48	10.69
	CV %age	7.02	115.94	72.75	54.61
	LSD @5%	6.26	5.98	3.77	2.57

The data in table revealed that Coragen 20SC and Radiant 120SC showed the best control against FAW expressing minimum FAW infestation %age (0, 0) followed by Emmamectin Benzoate 1.9EC expressing FAW infestation %age (1.25).

Table: 59.1 Results of Different insecticides against Army worm

Sr.No	Treatments	% AW before spray	% AW 72 HAA	% AW 7 DAA
1	Coragen 20SC	4.59	0.00	0.00
2	Radiant 120SC	4.58	2.50	0.00
3	Reatis 480FS	1.25	1.25	0.83
4	Emamectin Benzoate 1.9EC	5.01	2.08	0.83
5	Control	1.69	7.60	8.98
	CV %age	85.61	68.32	52.50
	LSD@ 5%	4.51	2.82	1.72

The data in table revealed that Coragen 20SC and Radiant 120SC showed the best control expressing minimum army worm infestation %age (0, 0) followed by Reatis 480FS and Emamectin Benzoate 1.9EC expressing army worm infestation %age (0.83, 0.83).

Table: 59.2 Results of different insecticides against Stem borer

Sr. No	Treatments	% SB before spray	% SB 72 HAA	% SB 7 DAA
1	Radiant 120SC	3.75	2.91	1.66
2	Emamectin Benzoate 1.9EC	2.13	1.26	1.26
3	Coragen 20SC	3.34	2.08	2.08
4	Reatis 480FS	6.31	5.89	5.05
5	Control	7.23	9.13	10.51
	CV %age	97.59	91.97	85.26
	LSD @ 5%	6.84	6.02	5.39

The data in table revealed that Emamectin Benzoate 1.9EC showed the best control against stem borer expressing minimum stem borer infestation %age (1.26) followed by Radiant 120SC expressing stem borer infestation %age (1.66).

6- Screening of Hybrid FH-1210 against Major insect pests of Maize.

The data of different insect pests were recorded which are presented in table below

Table: 60. Results of screening of FH-1210 against major insect pests

% Infestation Shootfly	% Infestation Stem borer	% Infestation Army worm	% Infestation FAW	% Infestation Cob borer
0<ETL	70>ETL	50>ETL	0	15>ETL
0<ETL	75>ETL	55>ETL	0	10>ETL
0<ETL	35>ETL	15>ETL	0	15>ETL
0<ETL	20>ETL	35>ETL	0	0<ETL
0<ETL	35>ETL	25>ETL	0	10>ETL
5=ETL	25>ETL	10>ETL	0	5=ETL
5=ETL	15>ETL	25>ETL	0	10>ETL

SOIL CHEMISTRY

KHARIF: 2020

1 Impact of different fertilizer doses on grain yield of maize hybrid (YH-5954)

This trail was laid out on 24-08-2020 in randomized complete block design with three replications, keeping plot size 3.15m×5m to find out most suitable level of NP fertilizer to harvest maximum yield of maize hybrid (YH-5954). The results are given as under:

Table # 61: Results of different fertilizer doses on grain yield of maize hybrid (YH-5954)

Treatments(kg/ha)				Yield (kg/ha)	Stand count	Days to 50% silking	Plant height(cm)	Ear height (cm)
	N	P	K					
T5	300	150	100	13323a	124	54	182	109
T6	325	162	100	12648ab	117	54	181	113
T4	275	137	100	12621ab	121	54	181	107
T2	225	112	100	12559ab	119	55	180	106
T3	250	125	100	11862b	115	54	181	105
T1	0	0	0	4983c	114	56	172	93.93
$LSD_{0.05}$								

Statistical analysis of data presented in table 61 revealed that different fertilizer doses under study significantly affected cob height, 50% days to silking and grain yield of maize. Maximum days to 50% silking were found in T1 (56 days). Conversely these were minimum in T3, T4, T5 and T6. T5 and T6 caused maximum cob height (113cm) disparately T1 turned out minimum cob height (93cm). Maximum plant height was attained in T6 (182cm) whereas T1 gave minimum plant height (172cm). T5 was out yielded by producing 13323 kg/ha seed grains, nonetheless statistically it was par with T6, T4, T2. T1 gave minimum yield 4983 kg/ha.

SPRING: 2021

2 The effect of phosphorus application method on grain yield of maize hybrid in spring season (YH-5482)

The experiment was conducted with the objective to find out the most effective method of phosphorus application to increase grain yield of maize hybrid. The experiment was laid out on 17-

02-2021 in randomized block design with replicated thrice. Sowing was done on both sides of bed top. The fertilizer doses N:P:K were 272:114:125 kg/ha. The results are given below:

Table # 62: Results of phosphorus application method on grain yield of maize hybrid in spring season (YH-5482)

Treatment	Method and time of application	Grain yield (kg/ha)	Stand count/ ha	Plant height (cm)	Ear Height (cm)	Days to 50% silking	Fresh cob weight (kg/ha)
T1	100% at sowing time through broad cast before making beds	8499	80846	204	109	73	12402
T2	100% at sowing time through broad cast after making beds	8800 (301)	81057 (211)	205.33 (1.33)	109 (00.00)	72	12741 (339)
T3	100% P through fertigation 12 DAS	9463 (964)*	81481 (635)	215.67 (11.67)	108.33 (-0.67)	71	13714 (1312)*
T4	50% P through fertigation 12 DAS + 50% P through fertigation at 5^{th} leaf stage	9823 (1324) *	81693 (847)	213 (9.00)	108.67 (-0.33)	71	14222 (1820)*
T5	50% P through fertigation 12 DAS + 50% P through fertigation at 8^{th} leaf stage	10262 (1763) *	82539 (1693)	214 (10.00)	108.67 (-1.53)	72	14815 (2413)*
$LSD_{0.05}$		324.88	32991	12.270	1.1922		3563.77

Note: The values in parenthesis in each cell are the difference from control term. * indicate significance of the difference

The statistical analysis of data showed phosphorus application method has non-significant effect on plant height, ear height and 50% days to silking. However, phosphorus fertigation has edge over broad cast method to increase plant height that was maximum attained in T3 (215cm) and minimum was recorded in T1 (204 cm). Cob height was maximum in broad cast method T1 and T2 (109cm) and minimum in P-fertigation method T3 (108.33 cm). Minimum days to 50% silking (71 days) was recorded where P-fertigation was done and maximum days (73) was recorded where phosphorus applied through broad cast method. Fresh cob weight and grain yield was significantly affected by P-fertigation method over/as compared to conventional broad cast method. Maximum grain yield was recorded in T5 (10262 kg/ha) where P was applied through fertigation followed by T_4 (9823 kg/ha) and minimum grain yield was recorded in T1 (8499 kg/ha) where P was applied through broad cast method.

The conclusion of the present study shows that phosphorus fertigation is the most effective method of phosphorus application compared with the conventional broad cast method. Phosphorus fertigation method synchronized with plant need which increase the nutrient efficiency, root development and resultantly grain yield increased.

3 Response of maize hybrid to split application of potassium at different growth stages in spring (YH-5482)

The objective of experiment was to investigation the effect of split application of potassium in grain yield of maize hybrid. The experiment was laid out on 17-02-2021 in randomized block design with three replications. The sowing was done on both sides of bed top. The fertilizer doses N:P:K were 272:114:125 kg/ha. The results are given as below:

Table # 63: Results maize hybrid to split application of potassium at different growth Stages in spring (YH-5482)

Treatment	Potassium application	Grain yield (kg/ha)	Stand count/ ha	Plant height (cm)	Ear height (cm)	Days to 50% silking	Fresh cob weight
T1	100% P at sowing time	8593	85502	223.33	108.8	73	12253
T2	50% K at sowing + 50% K at 5th leaf stage	9443 (850)*	83598 (1693)	225.67 (2.33)	109.3 (0.67)	72	13256 (1003)
T3	50% K at sowing time + 50% K at 8th leaf stage	9738 (1144)*	84867 (2962)	223.67 (0.33)	109.3 (0.67)	71	13445 (1192)*
T4	50% K at sowing + 50% at pre-tessling stage	10123 (1529)*	85714 (3809)	224.33 (1.00)	110 (1.33)	71	14065 (1812)*
T5	33% K at 5th leaf stage + 33% K at 8th leaf stage + 33% at pre-tessling stage	10678 (2085)*	85079 (3174)	226.33 (3.00)	110 (1.33)	72	14973 (2720)*
$LSD_{0.05}$		539	9641	3.6	2.11		1149

Note: The values in parenthesis in each cell is the difference from control terms * indicates significance of the difference.

The data presented in table 63 revealed that split application of potassium has not significantly affected the plant height, ear height and days to 50% silking. However, the treatment T5 shows that height was maximum reached to (226.33 cm) and minimum plant height was recorded in T1 (223.33 cm). Maximum ear height was attained in T5 and T4 (110 cm) and plant height decreased in T1 (108 cm) where all potassium was applied at sowing time. Days to 50% silking was reached in minimum days in T4 and T5 (71 days) than rest of the treatments. Highest fresh ear weight and grain yield was obtained in T5 (10678 kg/ha) where K was applied in three splits at different growth stages. Lowest fresh ear weight and grain yield was recorded in T1 (8593 kg/ha) where full dose of potassium was applied at sowing time.

It is concluded that T5 out yielded where potassium was applied in three splits as compared to T4, T3 and T2 where potassium was applied in two splits. The treatment T1 produced

minimum yield where 100% potassium was applied at sowing time. It is also concluded that time of application at different growth stages is more important to harvest maximum yield potential of maize hybrid rather than to apply 100% potassium fertilizer dose at sowing time.

4 Effect of potassium fertilizer doses on grain yield of maize hybrid (YH-5482)

The trail was laid out on 17-02-2021 in randomized complete block design with three replications, keeping plot size 3.15m × 5m to find out optimum dose of potassium fertilizer for maximum grain yield of maize hybrid (YH-5482) in spring season 2021. The results are given below:

Table # 64: Results of potassium fertilizer doses on grain yield of maize hybrid (YH-5482)

Treatments				**Grain yield (kg/ha)**	**Stand count/ha**	**Days to 50% silking**	**Plant height (cm)**	**Cob height (cm)**
	N	P	K					
T1	272	114	100	11278	86984	73	223	137
T2	272	114	125	11879 (601)	89100 (2116)	74	223 (0.00)	140.33 (3.33)
T3	272	114	138	11737 (459)	87819 (835)	74	225 (2.00)	138 (1.00)
T4	272	114	155	11756 (478)	87407 (423)	74	225.67 (2.67)	137.67 (0.67)
T5	272	114	168	11321 (43)	90370 (3386)	74	220.33 (-2.67)	142.33 (5.33)
$LSD_{0.05}$				808	4635		8.57	7.20

Note: The value in parenthesis in each cell is the difference from the control term.

The statistical data presented in table 64 revealed that potassium fertilizer doses under trail have no significant effect on all plant growth parameters including grain yield among various treatments. However, /nevertheless maximum plant height (225.67 cm) was observed in T4 followed by T3 (225.00 cm) and minimum was recorded in T5 (220.33cm). Maximum cob height was observed in T5 (142.33cm) and minimum in T1 (137cm). Grain yield data revealed that maximum grain yield was observed in T2 (11879 kg/ha) followed by T4 (11756 kg/ha) and minimum in T5 (11321 kg/ha). Data regarding potassium fertilizer doses shows that maximum yield was recorded in T2 where potassium fertilizer was (125 kg/ha), above this level of potassium fertilizer doses the yield was gradually decreased up to T5. Maize hybrid (YH-5482) showed its maximum yield potential up to potassium fertilizer doses (K_2O 125 kg/ha). Days to 50% silking reached earlier in T1 than all other potassium fertilizer doses. T2 is optimum potassium fertilizer dose to get maximum yield and it shows better interrelationship among the other essential nutrients. When plant gets too much potassium it inhibits absorption of other nutrients. Too much potassium can be unhealthy for maize plant because it affects the way; the soil absorbs other critical nutrients. Increasing potassium causes decreased iron and N uptake.

SEED PRODUCTION:

1. OPV'S MAIZE

Different seed categories of various maize varieties were produced for maintenance, experiments and sale purposes. The BNS seed was produced through half-sib method by hand pollination and Pre basic and basic in isolations through half-sib method by hand pollination and Pre basic and basic in isolations as detailed below

Table-65: Maize OPV's BNS, Pre Basic, and Basic Seed Production

Sr. No.	Name of Crop Variety	BNS (kg)	Pre-basic (kg)	Basic (kg)	Certified (kg)
Maize Kharif, 2020					
5.	GOHAR-19	6.0	5330	-	-
6.	CIMMYT PAK	3.0	-	-	-
7.	SWEET-1	3.0	-	-	-
8.	POP-1	3.0	-	-	-
Maize Spring, 2021					
5.	GOHAR-19	6.0	4230	-	-
6.	CIMMYT PAK	5.0	-	-	-
7.	SWEET-1	3.0	-	-	-
8.	POP-1	1.0	-	-	-

HYBRID MAIZE:
KHARIF 2020

i. Maintenance of Male Parental Line Y-22, Y-27 of Maize

Seed of Y22 was prepared (10 kg) and treated with weedicides and fungicide before sowing. Female parental line Y-22 was planted in isolation in square No. 26 on 10-09-2020 at Maize Seed Farm 64/5L, Yusafwala, Sahiwal. All the recommended agronomic practices (hoeing, weeding, and Irrigation & fertilizer application) were performed accordingly. Field issues like gap filling and thinning were addressed accordingly. Strict rouging was carried out to purify the field from off type plants especially before and at the time of flowering. Cobs were harvested after crop maturity and sun-drying was performed to minimize the moisture level. Total Produce of Y-22 with selected cobs during Kharif 2020 was 300 kg.

Seed of Y27 was prepared and treated with weedicides and fungicide before sowing. Male parental line Y-27 was planted in Hybrid Seed Production block with 4:1 female and male ratio on 12-08-2020 in square No. 27at Maize Seed Farm 64/5L, Yusafwala, Sahiwal. All the recommended agronomic practices (hoeing, weeding, and irrigation & fertilizer application) were performed accordingly. Filed issues like gap filling and thinning were addressed accordingly. Strict Roguing (removal of off-types from field) was carried out to purify the field from off type plants especially before and at the time of flowering. Cobs were harvested after crop maturity and sun-drying was performed to minimize the moisture level. Total Produce of Y27 with selected cobs during kharif2020 was 300 kg.

ii. Hybrid Seed Production

Under hybrid seed production program, seed production block of YH-1898 (Y22*Y27) was maintained in square No. 27 during Kharif 2020. Female parental line (Y-22) was sown along with male (Y-27) with 4:1 ratio on an area of 10 kanals on 12-08-2020. Similarly, seed production block of YH-5427 (Y222*Y27) and FH-1046 (F-308*Y27) was maintained in square No. 27 during kharif2020. Female parental lineY-222 and F-308 were sown along with male (Y-27) with 4:1 ratio on an area of 63kanals and 20 kanals respectively on 20-08-2020.

All the recommended agronomic practices (hoeing, weeding, and irrigation& fertilizer application) were performed accordingly. Filed issues like gap filling and thinning were addressed accordingly. Strict rogueing (removal of off-types from field) was carried out to purify the field from off type plants especially before and at the time of flowering. Cobs were harvested after crop maturity and sun-drying was performed to minimize the moisture level. Total produce of YH-1898, YH-5427 andFH-1046 was 240 kg, 2600 kg &560 kg during Kharif 2020, respectively.

Table 66: Seed Production during Kharif 2020

Material	Kharif 2020
	Produce (Kg)
YH-1898	240
YH-5427	2600
FH-1046	560
Y22	300
Y-27	300 (selected)

SPRING 2020

i. Maintenance of Parental Lines (Y22 and Y222) of Maize

Seed of two female parental lines (Y22 and Y222) was prepared and treated with weedicides and fungicide before sowing. Isolation was maintained for each line. Y22 and Y222 were planted on area of 1.25 acre and 3.0 kanals in square No. 4/27 & 8/26 on 09.03.2021, respectively at Maize Seed Farm 64/5L, Yusafwala, Sahiwal. Total Produce of Y22 and Y222 were 360 kg and 315 kg respectively.

ii. **Hybrid Maize Seed Production**

Under hybrid seed production program, seed production blocks of YH-1898(Y22*Y27) and YH-5427 (Y222*Y27) were maintained in square No. 2/24 and 3, 4, 5, 6/24 during spring 2021. Female parental lines were sown along with in 4:1 ratio on an area of 8 kanals for YH-1898, 76 kanals for YH-5427 on 17.03.2021and 12-02-2021 respectively. Total produce of YH-1898 and YH-5427 were 120 kg and 2980 kg, respectively during spring 2021.

Table 67: Seed Production of Hybrid Maize

Material	Spring 2020
	Produce (kg)
YH-1898	120
YH-5427	2980
FH-1046	-
Y22	360
Y222	315
Y-27	52

PARB PROJECTS:

PARB PROJECT 900:

Kharif 2020

Activity:

Forty (40) double haploids were sown under normal and stress condition (heat and drought). Selfing was done and data for morphological and physiological parameters (high row, good grain pitch ratio, good ear length, good plant aspect ratio, stay green and disease tolerant) were recorded.

Output:

Thirty (30) double haploids lines were selected for constitution of hybrids in next season and harvested including four testers.

Spring 2021

Activity:

Sowing of thirty (30) double haploid lines along with four (4) testers was done for constitution of DH hybrid in 1:4 ratio in isolations. Female lines were detasseled and allowed for open pollination

Output:

At maturity seventy (70) hybrids with sufficient seed were harvested for evaluation in next season under normal and stress conditions (drought & heat)

PARB PROJECT NO. 904.

KHARIF 2020

Reconstitution and seed multiplication of promising hybrids (20-30) for On-farm trials was designed during 01-07-2020 to 31-12-2020 under PARB project no. 904.

Activity:

Inbred lines of selected hybrids (25 single cross combinations in isolations) were sown in 1:2 on 17.08.2020 in square No. 24 at MMRI. De-tasseling was performed in each isolation and open pollination was allowed.

Output:

Harvesting of selected hybrids (25 single crosses) was completed.500 -1000 g seed of each hybrid was dried, shelled and stored.

SPRING 2021

On farm testing of (F1) selected hybrids at 20 locations and seed multiplication

Activity:

Multi-locational trials with an area of 1 kanal each were sown at 20 locations in Punjab during month of February, 2021. Trials were visited and data regarding flowering was noted during month of May.

Output:

Harvesting was completed and data regarding yield traits was recorded during month of June, Yield and quality data was analyzed and five (5) hybrids were selected by viewing both of criteria for further reconstitution.

STATIONS AND SUB-STATIONS

MAIZE RESEARCH STATION, FAISALABAD

SEASON AND ITS EFFECTS:

The detail of average maximum and minimum temperature and rainfall received is as follows:

Table 68: Summary of Metrological Data at MRS, Faisalabad

Sr. No.	Month/Year	Average Temperature (c°)		Rainfall (mm)
		Maximum	Minimum	
1	July, 2020	38.3	27.6	130.6
2	August, 2020	37.2	26.9	134.6
3	September, 2020	37.1	25.3	9.9
4	October, 2020	35.2	17.0	0
5	November, 2020	26.3	10.2	0.8
6	December, 2020	21	6.5	23
7	January, 2021	17.3	5.5	55.5
8	February, 2021	25.8	9.8	-
9	March, 2021	30.9	15.3	37.8
10	April, 2021	34.5	18.4	15.4
11	May, 2021	39.6	24.0	11.2
12	June, 2021	39.0	25.6	132

KHARIF 2020:

RESEARCH WORK DONE:

1. Detail of gene pool maintained during this season is given below:

Sr. No	Entries	Planted	Harvested
1	**Inbred lines**	213	203
2	**Inbreeding generations**		
	S_0	37	37
	S_1	12	12
	S_2	26	26
	S_3	62	62
	S_4	45	45
	S_5	16	16
	S_6	19	19
	S_7	12	12
Total		**229**	**229**

Hybrid Evaluation Yields Trials:

Eight (8) different yield trials of hybrids were sown for evaluation.

1. Hybrid Maize Macro Yield Trial (Kharif 2020)

A trial comprised of sixteen single cross hybrids including three hybrids as checks were sown on 29-07-2020 according to RCB design with three replications. The plot size was kept 4m x 3m. The harvesting was done on 23-11-2020.Data regarding different agronomic traits were recorded and hybrids showing good performance were selected for ON-Farm testing. The data are given in Table 1.

Table 69: Results of Hybrid Maize Macro Yield Trial (Kharif 2020), Faisalabad

Sr. No	Hybrid	Grain Yield kg/ha	Stand Count (%)	Days to 50% tasseling	Days to 50% silking	Plant Height (cm)	Ear Height (cm)	Plants harvested	Ears harvested
9	FH-1731	8153 a	50.00	57.50	59.50	145.00	67.50	47.50	51.50
2	FH-1400	8148 a	68.50	58.50	61.00	165.00	80.00	64.00	67.50
4	FH-1603	7638 a	78.00	55.50	58.50	120.00	45.00	69.00	72.50
1	FH-1377	7637 a	71.00	58.00	60.50	125.00	52.50	65.00	68.50
3	FH-406	7453 ab	77.50	56.00	58.50	135.00	52.50	71.00	74.00
7	FH1622-2	7317 ab	71.50	58.00	60.50	125.00	47.50	66.50	72.00
5	FH-1606	7196abc	77.00	55.00	58.00	140.00	62.50	67.00	71.50
12	FH-1779	6931abcd	58.50	60.50	62.50	120.00	60.00	56.50	60.00
13	**YH-5427 (C)**	**6757abcd**	**65.00**	**53.00**	**55.00**	**125.00**	**52.50**	**59.00**	**61.00**
16	P-1543	6756abcd	60.00	50.50	52.50	153.50	62.00	57.50	59.00
6	FH-1616	6741bcde	71.00	58.50	61.00	132.50	65.00	63.50	67.50
10	FH-1740	5996 cde	78.00	56.50	59.50	142.50	65.00	69.00	71.50
15	**NK-8441 (C)**	**5699 de**	**66.50**	**54.50**	**57.00**	**120.00**	**50.00**	**63.50**	**65.00**
14	**FH-1046(C)**	**5555 de**	**70.50**	**54.00**	**56.50**	**125.00**	**62.50**	**64.50**	**68.00**
8	FH-1624	5426 e	78.00	58.00	60.50	132.50	55.00	66.50	70.00
11	FH-1745	4498 e	68.00	55.00	58.00	140.00	70.00	63.00	67.00
CV%		**9.92**	**12.2**	**2.7**	**7.42**	**NS**	**NS**	**42.3**	**42.2**
LSD at 5%		**842.41**	**4.4**	**2.95**	**27**	**21.1**	**21.1**	**14.3**	**15.2**

Data presented in the table 69 revealed that differences in grain yield due to hybrids statistically significant at local check hybrids. The hybrid FH-1731 gave maximum grain yield of 8153.00 Kg/ha followed by local hybrid FH-1400 (8148kg/ha). Local hybrid FH-1603, FH-1377 and FH-406 showed higher yield over local check hybridYH-5427 (6757kg/ha). Significant differences were observed for days to 50% tasseling. Local hybrid FH-1779 took maximum days for 50% tasseling (60.50) and silking (62.50). Local hybrid FH-1400 attained maximum plant height of 165 cm while its cob height was 80cm. Most of the hybrids exhibited mid to low cob bearing character.

2. Hybrid Maize Micro Yield Trial I (Kharif 2020)

This trial comprised of sixteen (16) single cross hybrids including four hybrids as checks. They were sown on 29-07-2020, laid out according to RCB design with two replications. The plot size was kept 4m x 1.5m. The harvesting was done on 23-11-2020. Data regarding different agronomic traits were recorded and hybrids with good performance were selected for ON- Farm testing. The data are given in the following tables.

Table 70: Results of Hybrid Maize Micro Yield Trial-1 (Kharif 2020), Faisalabad

Sr. No	Hybrid	Yield kg/ha	Stand Count	Days to 50 % Tasseling	Days to 50 % Silking	Plant Height	Cob Height	Plant Harvested	Ears harvested
14	**FH-1046 ©**	**6874.41 a**	**24.00**	**56.50**	**59.50**	**132.50**	**57.00**	**22.00**	**23.00**
4	FH-1603	6661.62a	29.50	58.00	60.00	117.50	67.50	28.00	30.00
12	FH-1779	5953.34ab	24.50	55.00	57.50	136.00	69.50	23.50	24.00
6	FH-1616	5885.61ab	37.50	56.00	59.00	162.50	67.50	35.50	37.50
10	FH-1740	5859.86ab	30.00	54.00	56.50	141.00	62.50	27.50	28.50
2	FH-1400	5783.61ab	32.50	54.00	57.00	137.50	59.00	31.00	32.50

8	FH-1624	5049.35bc	25.50	57.00	59.00	151.00	73.50	24.50	24.50
9	FH-1731	5000.87bcd	30.00	57.00	59.50	122.50	62.50	28.50	29.50
15	**NK-8441 ©**	**4623.29bcd**	**32.00**	**56.50**	**58.50**	**127.50**	**55.00**	**29.00**	**29.50**
5	FH-1606	4589.70cd	27.50	56.50	58.50	155.00	67.50	27.50	28.00
1	FH-1377	4318.41cd	38.50	54.00	57.00	120.00	64.00	34.50	36.00
16	**P-1543 ©**	**4186.69cd**	**35.00**	**61.00**	**63.50**	**142.50**	**58.00**	**30.50**	**32.50**
3	FH-406	4060.70cd	36.00	58.50	61.00	117.50	52.50	33.00	34.00
11	FH-1745	3986.40cd	28.00	55.50	59.00	125.00	57.50	27.00	28.00
13	**YH-5427 ©**	**3927.00cd**	**38.50**	**57.50**	**60.00**	**113.50**	**42.50**	**33.50**	**34.50**
7	FH1622-2	3259.04d	24.50	56.00	58.50	132.50	62.50	24.50	26.00
CV%		**13.36**	**NS**	**2.2**	**NS**	**9.33**	**11.5**	**32.9**	**34.0**
LSD at 5%		**666.13**	**4.26**	**2.4**	**44.23**	**70.8**	**7.0**	**5.9**	**6.2**

Local hybrids FH-1603, 1779, FH-1616, FH-1740, FH-1400, FH-1624 & FH-1731 were statistically high yielder than commercial check NK-8441 (4623 kg/ha) but low yielder than local check FH-1046 (6874 kg/ha). Local hybrid FH-1603 gave maximum grain yield of 6662 kg/ha. The maximum number of days to 50% tasseling (61) and silking (63) was observed for the commercial hybrid P-1543. Differences in cob height were significant. The maximum plant height (162.50 cm) was shown by FH-1616 and cob height (73.50 cm) was shown by FH-1624. Above the mid cob bearing trend was apparent in most of the hybrids. Number of plants per plot and cobs harvested statistically showed non-significant differences.

3. Hybrid Maize Micro Yield Trial-II (Kharif 2020)

This trial was comprised of fourteen entries including two local hybrids as check. The trial was sown on 29-07-2020 in RCB design with three replications. The plot size was kept 4m x 2.25m. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 23-11-2020. Data regarding different characters were recorded and results are presented in Table below.

Table 71: Results of Hybrid Maize Micro Yield Trial-2 (Kharif 2020), Faisalabad

Sr. No	Hybrid	Yield kg/ha	Stand Count	Days to 50 % Tasseling	Days to 50 % Silking	Plant Height	Cob Height	Plant Harvested	No of Cobs
12	FH-1779	8930.00 a	32.00	55.00	58.00	127.50	55.00	28.00	28.50
14	**FH-1046 ©**	**8725.87a**	**35.50**	**56.50**	**58.50**	**125.00**	**55.00**	**32.00**	**33.50**
3	FH-406	8297.88ab	35.50	54.50	57.00	120.00	50.00	33.50	34.50
9	FH-1731	7400.68abc	31.50	54.50	56.50	142.50	62.50	31.00	31.00
8	FH-1624	7337.08abc	37.50	56.50	59.00	125.00	50.00	34.50	35.50
7	FH1622-2	7067.84bc	32.50	58.00	60.50	132.50	60.00	31.50	32.50
6	FH-1616	6921.12bc	32.00	56.00	59.00	142.50	60.00	30.50	32.00
4	FH-1603	6827.35cd	34.50	56.50	59.00	115.00	47.50	32.50	34.00
5	FH-1606	6639.20cd	32.00	57.00	59.00	115.00	42.50	30.50	31.00
13	**YH-5427 ©**	**6560.87cd**	**33.50**	**61.50**	**63.50**	**115.00**	**57.50**	**32.50**	**33.00**
10	FH-1740	6510.69cd	39.00	59.00	61.50	135.00	57.50	36.00	38.00
1	FH-1377	6268.51d	33.50	57.00	59.00	112.50	35.00	30.00	31.50
2	FH-1400	6174.55d	37.50	55.50	58.00	115.00	55.00	33.50	35.00
11	FH-1745	6005.71e	35.00	56.00	59.00	135.00	62.50	32.50	33.50
CV%		**1464.2**	**7.4**	**2.3**	**10.8**	**8.0**	**8.0**	**6.7**	**6.5**
LSD at 5%		**14.4**	**30.9**	**4.0**	**8.6**	**14.9**	**14.9**	**30.8**	**32.1**

Data presented in the above table revealed the significant differences in mean grain yields due to hybrids. Local hybrid FH-1779 gave the maximum grain yield of 8930 kg/ha and showed its worth over local check hybrids FH-1046 (8726 kg/ha). Mid to low cob bearing trend was observed in most of the hybrids. Differences in plant height and days to 50% silking were non-significant. The maximum plant height (142.5 cm) was shown by FH-1731 with a cob height of 62.5 cm. statistically significant differences were also observed for number of plants harvested.

4. Hybrid Maize Preliminary Yield Trials (Kharif 2020)

These trials comprised of five sets: four of them consisted of 30 single cross hybrids and one 20 single cross hybrids including three hybrids as checks in each set. They were sown on 29-07-2020. The trials were laid out in RCB design with two replications. The plot size was kept 4m x 0.75m. The harvesting was done on 23-11-2020.Data regarding different agronomic traits were recorded and hybrids with good performance were selected for ON-Farm testing. The data are given in Table given below:

Table 72: Results of Hybrid Maize Preliminary Yield Trial-1 (Kharif 2020), Faisalabad

Sr. No	Hybrid	Yield kg/ha	Stand Count (%)	Days to 50% tasseling	Days to 50% silking	Plant Height (cm)	Ear Height (cm)	Plants harvested	Ears harvested
22	FH-1912	11383a	19	50.5	52.5	190	105	18.5	19.5
9	FH-1865	11052ab	16.5	51	53.5	182.5	150	87.5	15
4	FH-1852	10765asc	18.5	48	50.5	187.5	161.67	107.5	17.5
12	FH-1868	10340abcd	17.5	51	53	190	156.67	85	16
14	FH-1870	10257ascd	16	51	53.5	182.5	151.67	90	15
11	FH-1867	10253abcde	17.5	50.5	52.5	175	146.67	90	16.5
24	FH-1914	9861.8b..de	17	48	50.5	192.5	95	16.5	18
28	**FH-1046**	**9628.5cd..f**	**15.5**	**50.5**	**52.5**	**185**	**100**	**16.5**	**16.5**
17	FH-1906	9495c…f	18	47.5	50	162.5	138.3333	92.5	17
27	FH-1918	9273.9c…g	17	50.5	52.5	195	92.5	16	15.5
7	FH-1858	9125.6c…h	20	51	53	177.5	155	105	17.5
13	FH-1869	9106.5c…h	17.5	53.5	56	165	138.3333	82.5	17.5
2	FH-1849	8827d..i	17	49.5	51.5	165	136.6667	80	17
29	**YH-5427**	**8566.8e…i**	**16.5**	**49**	**51**	**162.5**	**75**	**16.5**	**18.5**
8	FH-1861	8468f..i	18.5	52	53.5	165	135	72.5	18
21	FH-1911	8232.4g..j	18.5	52	54	187.5	100	16.5	18
10	FH-1866	7891.5h..j	16.5	50.5	52.5	190	161.6667	102.5	15.5
18	FH-1907	7511.8	18.5	48	50.5	165	141.6667	95	18
6	FH-1856	7499	19	51	53	155	125	67.5	18
23	FH-1913	7495.4	17.5	52	54	182.5	90	17.5	18.5
25	FH-1915	7466.2	19	47.5	50	152.5	80	18.5	19
3	FH-1847	7359.8	16	47.5	50	170	146.6667	100	14.5
26	FH-1916	7309.2	16	47.5	50.5	192.5	102.5	16	18
30	**S-7720 (c)**	**7261.5**	**16.5**	**54.5**	**56.5**	**185**	**89**	**18**	**18**
20	FH-1910	7181.5	19	50.5	53	192.5	165	107.5	17
19	FH-1908	7108.7	19	52.5	54.5	167.5	142	90	16.5
1	FH-1848	6752.2	17	50.5	53	148	123	75	15
CV%		**18.21**	**12.2**	**2.83**	**2.7**	**7.42**	**NS**	**17.1**	**16.1**
CD		**980**	**4.4**	**2.99**	**2.95**	**27**	**21.1**	**5.1**	**5.25**

The data presented in the Table 72 shows statistically significant differences in grain yield due to hybrids. Local hybrid FH-1912 gave the highest grain yield of 11383 kg/ha followed by FH-1865(11052 kg/ha). These hybrids along with FH-1852, FH-1868, FH-1870 and FH-1867 were statistically significant than local check hybrid FH-1046. Days to 50% tasseling and 50% silking showed statistically significant differences. The maximum days to tasseling (54.5) and silking (56.5) were taken by a commercial hybrid S-7720. Significant differences were observed for plant height while cob height showed non-significant differences. Maximum plant height was attained by FH-1918 (195 cm) while FH-1848 attained minimum plant height of 148 cm. Number of plants and cobs harvested per plot showed statistically significant differences.

Table 73: Results of Hybrid Maize Preliminary Yield Trial-2 (Kharif 2020), Faisalabad

Sr. No	Hybrid	Yield kg/ha	Stand Count (%)	Days to 50% tasseling	Days to 50% silking	Plant Height (cm)	Ear Height (cm)	Plants harvested	Ears harvested
14	FH-1950	12069a	15.5	50	52	142.5	77.5	15.5	18.5
26	FH-1880	11188ab	17.5	49.5	51.5	180	102.5	17.5	19.5
28	**FH-1046(c)**	**10866abc**	**18.5**	**48**	**50.5**	**167.5**	**72.5**	**17.5**	**18.5**
27	FH-1881	10668abc	18.5	49	51	182.5	95	18	19.5
11	FH-1947	10634abc	16.5	51	53	145	60	16	16.5
18	FH-1853	10525bcd	17.5	51	53.5	185	95	17	18.5
12	FH-1948	10084bcd	16.5	51.5	54	157.5	75	16	17
20	FH-1873	10011cde	19.5	48	50.5	180	90	18.5	21
21	FH-1874	9818cdef	19	49.5	53	187.5	95	18	19.5
7	FH-1942	9754cdef	17.5	51.5	53.5	185	95	17.5	18
5	FH-1940	9548defg	18	50	52	187.5	95	17	17.5
22	FH-1875	9056defg	17	49.5	51.5	192.5	100	16	18
15	FH-1951	8848efgh	16.5	50.5	52.5	157.5	77.5	15.5	17.5
25	FH-1879	8785efgh	17.5	50	52	172.5	87.5	12.5	18
6	FH-1941	8767fghi	16.5	51.5	53.5	192.5	107.5	16	17
24	FH-1878	8471fghi	16.5	50.5	52.5	192.5	95	15.5	17.5
9	FH-1944	8267ghij	18.5	52.5	54.5	175	182.5	17.5	18
19	FH-1872	8112ghij	18.5	48.5	50.5	187.5	100	18.5	19
10	FH-1945	7824hijk	17	50.5	52.5	165	75	17	17.5
4	FH-1939	7635hijk	16.5	51.5	53.5	192.5	97.5	16	18.5
17	**FNS-3(c)**	**7456ijkl**	**15.5**	**53**	**55.5**	**175**	**95**	**16**	**16**
23	FH-1876	7445ijkl	17.5	50.5	52.5	180	87.5	16.5	18
1	FH-1919	7365jklm	16	51	53	182.5	95	15	17
3	FH-1938	7363klm	17.5	53	56	205	107.5	16.5	18
2	FH-1937	7163klm	16.5	51.5	53.5	202.5	102.5	15.5	16.5
29	**YH-5427(c)**	**6967klm**	**18.5**	**47.5**	**50**	**185**	**95**	**17.5**	**18**
16	FH-1951	6642lm	16.5	50.5	52.5	170	82.5	16.5	17
30	**S-7720(c)**	**6049klm**	**17.5**	**51.5**	**53.5**	**187.5**	**105**	**17.5**	**17.5**
13	FH-1948 P	5845lm	16	54.5	57	145	80	16	16
8	FH-1943	5546m	18.5	52.5	55	167.5	82.5	17.5	17
CV%		**8.82**	**NS**	**7.2**	**NS**		**9.33**	**17.2**	**16.0**
CD		**760.71**	**4.26**	**2.4**	**44.23**		**70.8**	**5.7**	**5.4**

The data presented in the Table 73 showed that two local hybrids out yielded local check hybrid FH-1046. Local hybrid FH-1950 gave the highest grain yield of 12069 kg/ha followed by FH-1880 (11188 kg/ha). Days to 50% tasseling and plant height showed statistically non-significant differences while 50% silking and cob height showed statistically significant differences. Maximum plant height was attained by FH-1938 (205 cm) with a cob height of 107.5 cm while hybrid FH-1950 attained minimum plant height (142.5 cm) with a cob height of 77.5 cm. Number of plants and cobs harvested per plot were also showing statistically significant differences.

TABLE 74: Results of Hybrid Maize Preliminary Yield Trial-3 (Kharif 2020), Faisalabad.

Sr. No	Hybrid	Yield kg/ha	Stand Count (%)	Days to 50% tasseling	Days to 50% silking	Plant Height (cm)	Ear Height (cm)	Plants harvested	Ears harvested
14	FH-1928	11739 a	18.5	52.5	56	157.5	82.5	18.5	20.5
3	FH-1887	11083 a	16.5	52.5	56	200	105	16.5	17.5
12	FH-1926	10202 ab	17	54	56.5	155	80	15.5	16.5
2	FH-1886	10199ab	16	52.5	55.5	182.5	82.5	15.5	18
9	FH-1923	9579ab	16.5	50.5	53	170	82.5	15.5	16
4	FH-1888	9392abc	18	55	57.5	180	87.5	17.5	17.5
5	FH-1889	9019bc	16.5	55	57	172.5	85	16.5	18.5
1	FH-1882	8610bcd	18	52.5	55.5	167.5	72.5	16	16.5
24	FH-1952	8285cbd	15.5	52	54.5	175	90	15.5	15.5
17	FH-1931	8192cbd	18	52	54.5	172.5	90	16.5	17
16	FH-1930	7959cbd	15.5	51.5	54	175	82.5	16	16
8	FH-1921	7950cde	17	49	52	177.5	97.5	13	13.5
25	FH-1953	7567cde	17.5	50.5	52.5	162.5	82.5	16	17
11	FH-1925	7511cde	15.5	53.5	56	172.5	90	15	15.5
23	FH-1937	7506cde	15.5	52.5	55	160	82.5	15	15
7	FH-1920	7500def	17	50.5	52.5	175	105	16.5	18.5
26	FH-1954	7323def	17.5	53	55.5	162.5	72.5	16	15.5
6	**FNS-1©**	**7235efg**	**19.5**	**52.5**	**54.5**	**172.5**	**90**	**16.5**	**18**
29	**YH-5427©**	**6620efg**	**14.5**	**50.5**	**52.5**	**155**	**65**	**13**	**13.5**
21	FH-1935	6437fgh	15.5	54	56.5	192.5	100	14.5	13.5
15	FH-1929	6395fgh	18	54	56.5	157.5	77.5	18	18
18	FH-1932	6354ghi	17.5	53.5	56	162.5	80	15.5	16
19	FH-1933	6275ghi	15	52	53.5	167.5	90	13.5	14
28	**FH-1046©**	**6166ghij**	**17**	**52**	**54**	**155**	**72.5**	**16**	**16**
20	FH-1934	5883hijk	17.5	54	57.5	175	100	15.5	14.5
10	FH-1924	5851hijk	15.5	49	51	165	75	16	15.5
27	FH-1955	5477ijk	17	53.5	56	167.5	77.5	14.5	15
13	FH-1927	5388ijk	17	54.5	56.5	152.5	82.5	15.5	15.5
22	FH-1936	5342jk	14.5	53	55	160	77.5	14	14
30	**P-1543©**	**4779k**	**12.5**	**58**	**60.5**	**167.5**	**75**	**12**	**13**
CV%		**23.4**	**9.4**	**4.2**	**4.6**	**8.2**	**13.6**	**10.4**	**12.3**
CD		**1775.7**	**1.6**	**2.2**	**2.5**	**13.8**	**11.5**	**1.6**	**2.0**

The data presented in the Table 74 showed that Local hybrid FH-1928 gave the highest grain yield of 11739 kg/ha followed by FH-1887 (11083 kg/ha) while the local check FSN-1 (7235 kg/ha)

remained at 18th position. Days to 50% tasseling and plant height were showing statistically non-significant differences while 50% silking and cob height were showing statistically significant differences. Maximum plant height was attained by FH-1887 (200 cm) with a cob height of 105 cm. Number of plants and cobs harvested per plot were also showing statistically significant differences.

Table 75: Results of Hybrid Maize Preliminary Yield Trial-4 (Kharif 2020), Faisalabad

Sr. No	Hybrid	Yield kg/ha	Stand Count (%)	Days to 50% tasseling	Days to 50% silking	Plant Height (cm)	Ear Height (cm)	Plants harvested	Ears harvested
22	FH-1936	10690	15.5	54	56	165	77.5	15	17.5
27	**FH-1046©**	**9238.5**	**9.5**	**54**	**56.5**	**152.5**	**70**	**9.5**	**17**
6	FH-1964	8682	16	54.5	56.5	160	67.5	16.5	16.5
24	FH-1961	8571	18.5	52	54.5	181	77.5	18.5	17.5
23	FH-1946	7137.5	16	54.5	57.5	157.5	77.5	15	15.5
26	FH-988	6911	16	55.5	58.5	162.5	80	15.5	16
30	**DK-6754©**	**6594**	**16.5**	**52.5**	**54.5**	**183.5**	**71.5**	**16.5**	**16**
29	**NK-8441©**	**5848.5**	**16**	**52**	**56**	**136.5**	**68**	**16**	**17**
11	FH-1862	5646.5	16.5	52.5	56.5	165	72.5	14.5	14
1	FH-1956	5567	17.5	54	56.5	165	77.5	17	17.5
3	FH-1958	5558.5	15.5	61.5	63.5	142.5	67.5	15.5	16
18	FH-1892	5508	15.5	54.5	56.5	142.5	67.5	12.5	13
25	FH-1962	5498	14.5	55	57	175	87.5	13.5	13.5
8	FH-1850	5317	13.5	58.5	61	177.5	82.5	13.5	14.5
7	FH-1963	5278.5	15.5	59	61.5	145	65	14.5	14.5
15	FH-1883	5077	16.5	55	57	137.5	67.5	15	15
19	FH-1903	4926.5	14	54	57	140	65	13	14
13	FH-1879	4921	15.5	61	63.5	160	75	14.5	14.5
12	FH-1864	4759.5	15.5	56	59	157.5	65	14.5	15.5
14	FH-1881	4651.5	17.5	55.5	57.5	150	70	14.5	15.5
28	YH-5427	4626	16.5	53.5	56.5	145	70	17	17
10	FH-1860	4615	17	53	55.5	162.5	72.5	16.5	17
5	FH-1960	4488	17	55.5	58.5	177	73	16	17
21	FH-1922	4468	14	52	54.5	175	75	14	17
16	FH-1884	4433	15.5	58.5	61.5	125	62.5	14.5	15
9	FH-1857	4275	16	55	57	150	67.5	15.5	15.5
4	FH-1959	4155.5	12.5	59.5	59.5	140	62.5	12	12.5
17	FH-1885	3848	14	55.5	57.5	135	65	13	13
20	FH-1917	3720.5	14.5	55	58.5	142.5	67.5	14.5	14.5
2	FH-1957	2304.5	13.5	55	58	152.5	67.5	13.5	13.5
CV%		5.75	NS	5.2	2.5	7.56	10.3	13.5	11.9
LSD at 5%		320.75	5.2	3	3.4	32	19.7	2	1.8

The data presented in the Table 75 shows that Local hybrid FH-1936 gave the highest grain yield of 10690 kg/ha followed by local check hybrid FH-1046 (9238.5 kg/ha). Days to 50% tasseling & silking showed statistically significant differences. Maximum plant height was attained by **DK-6754** (183.5 cm) with a cob height of 71.5 cm. Number of plants and cobs harvested per plot were also showing statistically significant differences.

Table 76: Results of Hybrid Maize Preliminary Yield Trial (Kharif 2020), Faisalabad

Sr. No	Hybrid	Yield kg/ha	Stand Count (%)	Days to 50% tasseling	Days to 50% silking	Plant Height (cm)	Ear Height (cm)	Plants harvested	Ears harvested
15	FH-1400-1	8892.5	16.5	56	59	152.5	80	16.5	17
16	FH-1675	8186	15	59.5	62	140	70	15	15.5
7	FH-1969	7932.5	18	54	56.5	140	57.5	16.5	16.5
12	FH-1975	7655	19	49.5	52	172.5	80	19	21
19	**YH-1898©**	**7001.5**	**16.5**	**54.5**	**57**	**140**	**60**	**16.5**	**16.5**
17	FH-1453	6462	15.5	57.5	60	152.5	85	14.5	14.5
18	**NK-8441©**	**6457.5**	**17.5**	**61**	**63**	**157.5**	**72.5**	**16.5**	**17.5**
14	FH-1983	6152.5	14.5	60	62.5	142.5	60	13.5	13.5
20	**FH-1046©**	**5807**	**14**	**57.5**	**60**	**140**	**72.5**	**14**	**14.5**
13	FH-1976	5352	17.5	55	58	105	42.5	17	17
5	FH-1943	5346.5	18	52.5	54.5	127.5	40	16	16
3	FH-1901	4986	15.5	56.5	59	127.5	57.5	15.5	15
6	FH-1967	4972	14.5	52.5	55.5	137.5	55	14.5	14.5
4	FH-1965	4903.5	16	57	59.5	107.5	55	16	16.5
8	FH-1971	4541.5	16	51.5	53.5	142.5	52.5	13.5	13.5
1	FH-1896	4373.5	15	55.5	58	142.5	60	13	13
10	FH-1973	4214.5	16	55	57.5	165	72.5	15.5	16
11	FH-1974	3901	16.5	57	59	152.5	75	16.5	16.5
9	FH-1972	3896	18	55	58	132.5	62.5	15.5	15.5
2	FH-1899	3760.5	15.5	60	62.5	142.5	55	15	15
CV%		**5.60**	**12.5**	**6.0**	**5.0**	**9.1**	**5.4**	**13.3**	**15.2**
LSD at 5%		**321.14**	**6.1**	**3.3**	**3.3**	**30**	**20.1**	**2.0**	**2.4**

The data presented in the Table 76 showed statistically significant differences in grain yield due to hybrids. Local hybrid FH-1400-1 gave the highest grain yield of 8892.5kg/ha followed by FH-1675(8186 kg/ha). These hybrids along with FH-1969 and FH-1975 were statistically significant than check hybrids YH-1898, NK-8441 & FH-1046. Days to 50% tasseling and 50% silking showed statistically significant differences. The maximum days to tasseling (61) and silking (63) were taken by a commercial hybrid NK-8441. Significant differences were observed for plant height while cob height showed non-significant differences. Maximum plant height was attained by FH-1975 (172.5 cm) with a cob height of 80 cm. Number of plants and cobs harvested per plot showed statistically significant differences.

4. National Uniform Hybrid Maize Yield Trial (1st year testing) (Kharif 2020)

This trial comprising one hundred and seventeen (117) entries was sown on 30-07-2020. The trial was laid out in RCB design with three replications. The plot size was kept 4m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 24-11-2020. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table below

Table 77: Results of National Uniform Hybrid Maize Yield Trial set I (Kharif 2020), Faisalabad

Sr. No	Entry No	Yield kg/ha	Stand Count	Days to 50 % Tasseling	Days to 50 % Silking	Plant Height	Cob Height	No of Cobs
1	6	9874a	37	52	54	185	92.5	36
2	31	9284	40	53	55	217.5	112.5	36
3	25	9217	39	51	53	190	95	34
4	96	9101	34	51	53	192.5	95	33
5	4	8673	39	50	52	197.5	105	40
6	75	8361	37	51	53	157.5	67.5	35
7	2	8114	40	50	52	180	95	41
8	37	8111	35	50	53	167.5	92.5	35
9	103	8008	41	52	53	185	87.5	38
10	12	7992	40	50	52	185	97.5	31
11	28	7964	36	52	54	190	100	35
12	15	7915	37	52	54	195	100	32
13	39	7854	39	51	53	170	75	34
14	18	7813	40	52	54	170	77.5	36
15	108	7776	34	51	53	180	90	33
16	79	7768	38	52.5	54.5	167.5	77.5	29
17	64	7704	27	53	55	192.5	90	25
18	97	7687	40	51	53	182.5	105	35
19	33	7603	33	51	53	187.5	95	28
20	110	7584	34	52	53	172.5	82.5	25
21	48	7524	36	52	54	182.5	95	35
22	40	7518	37	51	53	180	102.5	34
23	78	7474	38	52	54	172.5	82.5	33
24	76	7466	36	51	53	177.5	90	28
25	114	7375	32	50	52	162.5	75	34
26	68	7186	36	51	53	195	100	33
27	113	7175	32	51	53	160	90	31
28	43	7128	31	52	55	210	100	32
29	47	7101	35	51	53	185	100	36
30	10	7077	29	52	54	190	100	30
31	85	7045	37	51	53	187.5	100	36
32	35	6965	33	53	55	167.5	75	29
33	74	6900	33	52	53	175	80	30
34	30	6897	34	53	55	167.5	80	30
35	81	6871	37.5	52	54	177.5	90	31
36	95	6848	24	55	57	190	102.5	24
37	45	6821	24	52	54	192.5	87.5	28
38	5	6678	38	52	54	197.5	100	32
39	65	6635	29	52	55	162.5	85	27
40	41	6448	33	51	53	182.5	87.5	31
41	51	6405	33	50	52	152.5	90	28
42	44	6349	27	52	54	180	90	21
43	106	6348	34	50	52	177.5	82.5	27

44	71	6339	25.5	51	53	170	87.5	25
45	26	6212	33	50	52	175	85	32
46	107	6202	31	52	54	167.5	82.5	31
47	24	6059	35	53	55	200	100	26
48	82	6057	33	53	55	157.5	72.5	25
49	99	6055	41	50.5	52.5	195	105	35
50	100	6049	41	49	51	190	87.5	36
51	66	6045	31	52	54	165	92.5	28
52	70	6017	17	51	53	187.5	97.5	19
53	8	5902	32	52	54	182.5	92.5	28
54	34	5822	28	52	54	185	82.5	28
55	73	5816	36	53	55	162.5	72.5	25
56	63	5772	28	52	54	185	100	23
57	42	5762	30	51	53	162.5	72.5	26
58	52	5713	26	53	55	172.5	82.5	25
59	55	5706	28	51	56	182.5	90	23
60	67	5625	30	52	54	175	90	24
61	3	5535	37	51	53	160	65	29
62	93	5523	40	52	54	165	75	39
63	105	5517	31	53	55	175	92.5	27
64	101	5421	33	53	54	195	105	29
65	22	5347	32	51	53	177.5	90	25
66	16	5319	20	53	55	172.5	92.5	22
67	32	5254	16	53	55	160	90	19
68	72	5232	21	52	54	172.5	80	20
69	84	5224	22	52	54	160	85	20
70	61	5211	20	53	55	162.5	87.5	21
71	88	5200	31	52	54	170	72.5	26
72	60	5180	21	51	53	172.5	85	19
73	**1**	5178	26	53	55	150	75	25
74	80	5125	36	51	53	175	92.5	32
75	58	5109	23	51	53	162.5	80	22
76	29	5106	17	50	52	182.5	100	17
77	104	5098	38	53	56	177.5	85	33
78	77	5067	30	51	53	170	90	19
79	50	5044	37	52	54	185	90	27
80	49	4976	21	51	53	182.5	85	20
81	98	4906	39	49	51	197.5	95	37
82	46	4883	31	50	52	152.5	75	27
83	36	4880	16	54	56	165	80	19
84	92	4808	33	52	54	167.5	77.5	28
85	9	4808	26	52	54	170	87.5	24
86	87	4800	33	52	54	127.5	73.5	31
87	38	4766	17	52	54	170	77.5	24
88	17	4745	29	52	54	167.5	87.5	26
89	13	4710	18	51	53	180	95	18
90	27	4696	16	54	56	172.5	95	16

91	62	4602	29	52	54	140	60	24.5
92	57	4559	23	52	54	142.5	60	26
93	94	4479	38	51	53	155	82.5	28
94	116	4448	29	52	54	175	95	24
95	69	4263	17	55	57	152.5	82.5	17
96	23	4235	29	52	54	172.5	85	27
97	86	4124	29	53	55	175	85	25
98	111	4108	32	53	55	160	82.5	29
99	109	4074	19	54	56	140	62.5	17
100	115	4026	17	52	54	175	92.5	16
101	56	3938	23	54	56	152.5	75	21
102	14	3903	21	52	54	170	85	22
103	53	3848	25	54	56	155	77.5	23
104	117	3817	25	49	51	140	67.5	19
105	102	3787	18	51	54	190	75	18
106	11	3693	19	52	55	157.5	60	17
107	19	3620	32	51	52	155	70	26
108	112	3593	21	52	53	155	70	19
109	21	3485	35	51	54	167.5	75	29
110	83	3387	17	54	56	165	80	15
111	7	3277	16	55	57	185	95	16
112	59	2985	17	52	54	127.5	62.5	14
113	20	2800	17	53	55	135	67	16
114	54	2784	15	55	57	147.5	77.5	15
115	91	2593	24	52	54	130	57.5	23
116	89	2244	14	52	54	152.5	62.5	13
117	90	2177	17	53	56	135	52.5	16

Data presented in Table 77 showed significant differences for grain yield kg/ha for seven entries. The Entry coded as ‘6’ out yielded with grain yield 9874 kg/ha followed by entry ‘31’ (9284 kg/ha). Entry coded as ‘90’ was the lowest yielder with grain yield 2177 kg/ha. Statistically significant differences were also observed for all other traits.

National Uniform Hybrid Maize Trial set II (Kharif 2020)

The set II comprised of one hundred and eleven (111) entries was sown on 30-07-2020. The trial was laid out in RCB design with three replications. The plot size was kept 4m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 24-11-2020. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table below.

Table 78: Results of National Uniform Hybrid Maize Trial set II (Kharif 2020), Faisalabad

Sr. No	Entry No	Yield kg/ha	Stand Count	Days to 50% Tasseling	Days to 50 % Silking	Plant Height	Cob Height	No of Cobs
1	71	7429	34	51	52	170	85	24
2	70	7369	35	50	52	180	90	33
3	68	7346	35	50	52	165	90	34
4	105	7302	38	51	52	190	100	35
5	65	7022	38	50	52	182.5	95	37

6	63	6610	37	51	53	162.5	85	34
7	87	6586	33	48.5	50.5	160	77.5	26
8	66	6583	37	51	53	195	110	37
9	104	6519	33	52	54	197.5	102.5	36
10	19	6389	34	52	54	160	80	30
11	75	6138	33.5	51	53	150	82.5	32.5
12	85	6076	32.5	52	54	187.5	102.5	32.5
13	93	6053	35	52	54	137.5	60	37
14	15	6040	29	51	53	167.5	85	35
15	1	5943	31	52	54	147.5	70	31
16	28	5831	29	52	54	135	62.5	34.5
17	59	5829	27	51	53	152.5	70	34
18	84	5806	36	50.5	52.5	175	90	33
19	3	5795	33	51	52	165	92.5	29
20	7	5744	31	50	52	162.5	85	30
21	48	5652	36	50.5	52.5	157.5	70	34.5
22	30	5640	32.5	51.5	53.5	145	65	28
23	44	5636	33.5	50.5	52.5	177.5	97.5	30
24	14	5630	18	53	55	157.5	77.5	18
25	80	5615	32.5	51	53	187.5	100	35.5
26	81	5549	32.5	53.5	55.5	162.5	80	36.5
27	90	5434	36	52	54	155	67.5	28
28	91	5408	34	51.5	53.5	150	72.5	27
29	4	5394	35	53	55	165	77.5	30
30	79	5368	35.5	51	53	185	105	29
31	67	5277	37	51	52	170	90	22
32	97	5204	33	51	53	155	97.5	30
33	96	5139	29	51	53	155	82.5	25
34	103	5042	37	50	52	135	62.5	24
35	57	5040	33	52	54	167.5	85	33
36	20	4905	32	52	54	152.5	77.5	32
37	13	4899	31	52	54	192.5	105	23
38	45	4894	34	50.5	52.5	172.5	90	30.5
39	33	4889	38.5	51	53	160	65	31.5
40	73	4863	24	52	54	160	75	24
41	8	4822	35	51	53	180	90	26
42	95	4808	29	51.5	53.5	162.5	72.5	21
43	83	4774	33.5	54	56	170	82.5	23
44	2	4744	37	51	53	137.5	55	30
45	22	4712	37	49	51	152.5	75	35
46	72	4685	23	52	54	145	72.5	23
47	23	4655	35	52	54	170	85	29
48	62	4586	38	51	53	162.5	85	29
49	47	4538	36.5	52.5	54.5	165	90	29

50	34	4527	28	52	54	147.5	67.5	37
51	24	4524	22	54	56	162.5	77.5	20
52	89	4508	34	52	54	170	85	21
53	42	4393	32	52	54	165	75	22
54	35	4368	36.5	53	55	137.5	67.5	25.5
55	37	4349	31	53.5	55.5	172.5	82.5	24.5
56	39	4285	39	51	53	152.5	80	28
57	18	4285	25	51	53	177.5	82.5	30
58	32	4282	35.5	51.5	53.5	180	97.5	30.5
59	110	4275	36	51	52	135	55	29
60	94	4224	29	51.5	53.5	185	95	21
61	43	4204	33	51.5	53.5	167.5	95	26.5
62	58	4130	22	50	52	177.5	85	18
63	60	4076	16	53	55	177.5	90	17
64	69	4040	34	50	52	130	57.5	20
65	77	4003	27.5	54	56	145	70	25.5
66	17	3988	24	51	53	155	77.5	20
67	101	3965	33	49	51	120	47.5	26
68	82	3905	22	50.5	52.5	142.5	70	19.5
69	21	3854	26	53	55	162.5	87.5	24
70	12	3844	20	53	55	160	90	19
71	52	3836	26	52	54	155	42.5	22
72	88	3819	28	53	55	182.5	90	17
73	102	3804	31	51	53	142.5	82.5	21
74	49	3801	34.5	50	52	165	92.5	22
75	51	3780	31	52	54	170	92.5	18
76	16	3731	33	50	52	117.5	45	30
77	36	3659	26.5	52.5	54.5	142.5	57.5	22
78	50	3654	38	52	54	185	100	24
79	99	3628	33	53	55	150	77.5	24
80	11	3567	18	52	54	195	102.5	15
81	74	3556	20	52	54	155	82.5	20
82	26	3519	18.5	51	53	157.5	85	22.5
83	98	3443	27	52	54	140	82.5	23
84	41	3400	27.5	53.5	55.5	152.5	77.5	17.5
85	6	3369	18	49	51	145	75	22
86	92	3275	33	51	53	195	85	24
87	53	3257	18.5	52.5	54.5	150	60	18
88	86	3226	16.5	51	53	160	57.5	14
89	31	3145	35	50	52	152.5	75	34
90	61	3061	15	51	53	167.5	87.5	15
91	64	3061	25	49	51	132.5	65	15
92	109	3001	32	51	53	137.5	52.5	22
93	106	2987	33	50	52	135	50	22

94	56	2961	32	52	53	172.5	92.5	28
95	46	2941	35.5	52	54	155	72.5	17
96	38	2884	39.5	51	53	140	65	24.5
97	76	2865	26.5	51.5	53.5	172.5	55	22
98	111	2843	35	51	53	140	60	30
99	27	2746	13	55	57	162.5	87.5	13
100	100	2731	15	51	52	142.5	65	15
101	108	2672	29	52	54	120	55	19.5
102	5	2525	20	52	54	120	55	18
103	78	2482	15	54	56	100	55	21
104	54	2427	31	52	54	165	75	24
105	10	2385	15	52	53	150	77.5	15
106	107	2379	35	50	52	142.5	82.5	16
107	25	2020	26	50.5	52.5	145	45	16.5
108	9	1638	23	52	54	155	77.5	12
109	29	1614	25.5	49	51	142.5	65	11
110	40	1296	28.5	52	54	130	65	9.5
111	55	1261	30	49	51	172.5	85	16

Data presented in Table 78 showed significant differences for grain yield kg/ha among the hybrids. The Entry coded as '71' out yielded with grain yield 7429 kg/ha followed by entry '70' (7369 kg/ha). Entry coded as '55' was the lowest yielder with grain yield 1261 kg/ha. Statistically significant differences were also observed for all other traits.

National Uniform OPV Maize Trial

This trial comprising of five (5) entries was sown on 30-07-2020. The trial was laid out in RCB design with three replications. The plot size was kept 4m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 24-11-2020. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table 79.

Table 79: Results of National Uniform OPV Maize Trial (Kharif 2020), Faisalabad

Sr. No	Entry No	Yield kg/ha	Stand Count	Days to 50 % Tasseling	Days to 50 % Silking	Plant Height	Cob Height	No of Cobs
1	**1**	3961	30	50	52	195	92.5	28
2	**4**	3370	23	51	54	177.5	82.5	19
3	**3**	3289	21	51	53	155	67.5	19
4	**2**	2774	19	49	51	155	82.5	13
5	**5**	1958	18	52	56	167.5	87.5	14

5. Punjab Agriculture Research Board (PARB) Projects:

1. Nutrition enhancement of crops, fruits, vegetables and their products under climate change scenario (PARB NO. 904)

One hundred nineteen (119) single cross hybrids were evaluated for quality parameters.

2. **Acceleration of maize breeding through inducer line mediated doubled haploid inbred lines for development of climate smart high yielding maize hybrids (PARB no.900)**

Ten (10) single cross hybrids were used with two (02) inducer lines. Two hundred (200) crosses were made. One thousand (1000) Haploid seeds were developed.

Seed Production

Two different isolated blocks of composite variety and hybrid were planted for seed production. Following table indicate the seed quantity produced.

Table 80: Seed Production, Kharif-2020, Faisalabad

Sr. No.	Entry	Seed production (Kgs)
1	FH-1046 (Hybrid)	180
2	Malka-16 (OPV)	570

Spring 2021:

Twelve (11) different yield trials of hybrids were sown for evaluation.

1. Hybrid Maize Macro Yield Trial No. 1 (Spring 2021)

A trial comprised of sixteen single cross hybrids including five local hybrids as checks were sown on 17-02-2021 according to RCB design with three replications. The plot size was kept 4m x 3m. The harvesting was done on 15-06-2021.Data regarding different agronomic traits were recorded and hybrids showing good performances were selected for ON-Farm testing. The data are given in Table 81.

Table 81: Results of Hybrid Maize Macro Yield Trial No. 1 (Spring 2021), Faisalabad

Sr. No	Hybrid	Yield (kg/ha)	Stand Count	Days to 50% Tasseling	Days to 50% Silking	Plant Height (cm)	Ear Height (cm)	Cobs Harvested
15	**P-1429 ©**	**13720.7**	**81.5**	**64.5**	**66.5**	**192.5**	**90**	**83.5**
6	FH-1616	12264	81.5	71	73	182.5	90	76.5
11	FH-1857	11982.3	72.5	70	72	177.5	92.5	78.5
2	FH-1400	11875.3	79	68.5	70.5	170	97.5	76
13	**FH-1046©**	**11468.8**	**66**	**69**	**71**	**180**	**97.5**	**62**
3	FH-1453	11364.6	85	69.5	71	157.5	90	83.5
14	**YH-5427©**	**11170.5**	**82.5**	**68**	**70**	**170**	**92.5**	**80**
10	FH-1745	11078.8	74	69.5	71.5	200	100	74.5
16	**DK-6724©**	**10814.7**	**79**	**64.5**	**66.5**	**175**	**82.5**	**74.5**
1	FH-0793	10679.8	88	68.5	70	177.5	95	77
5	FH-1606	10511.9	83	67.5	69.5	170	87.5	80
8	FH-1731	10268	83.5	68	70	190	105	72
9	FH-1743	9807.28	76	67	69	187.5	97.5	72.5
7	FH-1622	9258.63	81	67.5	34.5	167.5	100	62
12	**FH-0988©**	**8300.1**	**76**	**71**	**73**	**185**	**110**	**55**
4	FH-1528-2	7401.01	85.5	66	68	157.5	90	57.5

Data presented in the Table 81 revealed statistically significant differences in grain yield due to hybrids. The hybrid FH-1616 ranked 2nd by giving grain yield of 12264 Kg/ha followed by local hybrid FH-1857 (11982.3 kg/ha), FH-1400 (11875.3kg/ha) and showed their worth over check

hybrids FH-1046, YH-5427 and DK-6724 in grain yield. Significant differences were observed for days to 50% tasseling and silking. Local hybrid FH-988 took the maximum days for 50% tasseling (71) and silking (73). Local check hybrid FH-1745 attained the maximum plant height and cob height of 200 cm and 100 cm respectively. Most of the hybrids exhibited mid to low cob bearing character. Number of cobs harvested was also showing statistically significant differences.

2. Hybrid Maize Micro Yield Trials (Spring 2021)

This trial comprised of eighteen (18) single cross hybrids including one commercial and two local hybrids as checks. They were sown on 17-02-2021, laid out according to RCB design with two replications. The plot size was kept 4m x 1.5m. The harvesting was done on 15-06-2021. Data regarding different agronomic traits were recorded and hybrids with good performance were selected for on farm testing. The data are given in the following tables.

Table 82: Results of Hybrid Maize Micro Yield Trial-1 (Spring 2021), Faisalabad

Sr. No	Hybrid	Yield (kg/ha)	Stand Count	Days to 50% Tasseling	Days to 50% Silking	Plant Height (cm)	Ear Height (cm)	Plants Harvested
1	FH-1881	12923	35	70	71.5	200	110	35
2	FH-1865	12782	35.5	70	72	155	87.5	43.5
3	P-1429	12174	40	64.5	67	187.5	72.5	39
4	FH-1879	12244	42.5	66.5	68.5	182.5	97.5	42
5	FH-1857	12270	36	70	71.5	170	92.5	40
6	**FH-1046©**	**12426**	**38**	**69.5**	**71.5**	**170**	**90**	**34**
7	FH-1409	11845	39	66.5	68.5	165	72.5	37
8	FH-1609	11467	38.5	69	71	165	85	37.5
9	FH-1205-1	11290	42	63.5	65.5	167.5	90	43.5
10	**YH-5427©**	**11159**	**40.5**	**67.5**	**69.5**	**170**	**90**	**38**
11	FH-1743-1	10949	37.5	68.5	70.5	170	87.5	35.5
12	DK-6724	9908	43	63	65	167.5	75	42.5
13	FH-1886	9876	40	68	70	170	90	37.5
14	FH-1855	9192	40.5	70	72	160	82.5	40
15	FH-1867	9972	42	70.5	72	165	92.5	40.5
16	FH-1681	9168	35	69.5	71.5	160	70	32
17	**FH-0988©**	**7999**	**29.5**	**70.5**	**73**	**180**	**95**	**24**
18	FH-1528-1	7682	41.5	69.5	71.5	172.5	100	32
CV%		NS	7.43	1.87	2.13	NS	10.35	NS
CD		2818.8	5.6627	2.886	3.4023	48.913	21.398	7.9347

Data presented in above table revealed that differences in mean grain yields due to hybrids were statistically non-significant. Local hybrid check FH-1881 gave the maximum grain yield of 12923 kg/ha followed by the local hybrid FH-1865 (12782 kg/ha) and remained at the par to each other. Significant differences were observed for days to 50% tasseling and silking. The maximum number of days to 50% tasseling (70.5) was observed for local hybrid FH-1867while its days to 50% silking remained 73 days. Differences in plant height were also significant. Mid cob bearing was observed in most of the hybrids. The maximum plant height (200 cm) was also shown by local hybrid FH-1881with a cob height of 110 cm. Number of cobs harvested showed statistically non-significant differences while plant harvested and stand count were statistically significant.

3. Hybrid Maize Micro Yield Trials (Spring 2021)

This trial comprised of twenty (20) single cross hybrids including checks. They were sown on 17-02-2021, laid out according to RCB design with two replications. The plot size was kept 4m x 1.5m. The harvesting was done on 15-06-2021. Data regarding different agronomic traits were recorded and hybrids with good performance were selected for on farm testing. The data are given in the following tables.

Table 83: Results of Hybrid Maize Micro Yield Trial-2 (Spring 2021), Faisalabad

Sr. No	Hybrid	Yield (kg/ha)	Stand Count	Days to 50% Tasseling	Days to 50% Silking	Plant Height (cm)	Ear Height (cm)	Cobs Harvested
8	FH-1935	12584.39	43	69.5	71.5	165	85	41
12	FH-1954	12255.51	39	64.5	66.5	185	87.5	39
20	**NK-8441©**	**12201.74**	**41.5**	**64.5**	**66.5**	**177.5**	**85**	**46**
18	**P-1429©**	**12097.45**	**42**	**63.5**	**65.5**	**187.5**	**75**	**43**
17	**YH-5427©**	**11659.24**	**42**	**70**	**72**	**170**	**97.5**	**41.5**
14	FH-2044	11568.31	40.5	67	69	182.5	95	37.5
16	**FH-1046©**	**11522.36**	**34.5**	**70**	**72**	**172.5**	**102.5**	**33.5**
6	FH-1925	11316.06	37.5	65.5	67.5	185	85	35
7	FH-1931	11233.16	40.5	71	73.5	175	85	38
10	FH-1948	10894.08	43.5	70	72	167.5	95	42
3	FH-1914-2	10861.47	43.5	70.5	72	152.5	80	55.5
9	FH-1942	10683.35	37	69.5	71.5	180	95	37
4	FH-1920	10576.2	36.5	70.5	72.5	170	85	38.5
13	FH-1960	10129	34.5	68.5	70.5	180	90	33
1	FH-1912	9705.433	41.5	69.5	71.5	162.5	92.5	38
19	**DK-6724©**	**9515.476**	**41**	**64**	**66**	**175**	**80**	**40**
2	FH-1914	9442.916	35.5	67.5	69.5	162.5	92.5	38
5	FH-1922	9001.056	37.5	67.5	69.5	142.5	67.5	38.5
15	**FH-988©**	**8623.917**	**37.5**	**70**	**72**	**175**	**100**	**30.5**
11	FH-1953	7795.602	24.5	70.5	72.5	185	90	21.5
CV%		**15.18**	**6.21**	**1.03**	**0.89**	**5.79**	**5.1**	**NS**
CD		**2988.9**	**5.0652**	**1.6054**	**1.4323**	**23.178**	**28.399**	**7.7066**

Data presented in the above table revealed the significant differences in mean grain yields due to hybrids. Local hybrids FH-1935 gave the maximum grain yield of 12584.39 kg/ha followed by FH-1954 (12255.51 kg/ha). Mid to low cob bearing trend was observed in most of the hybrids. Differences in plant height and cob height were significant. The maximum plant height (187.5 cm) was shown by P-1429 with a cob height of 115 cm. statistically non-significant differences were observed for number of cobs harvested.

4. Hybrid Maize Preliminary Yield Trial (Spring 2021)

This trial comprised of five sets: four of them consisting of thirty single cross hybrids and one contain twenty (20) single cross hybrids including two check hybrids in each set. They were sown on 17-02-2021. The trials were laid out in RCB design with two replications. The plot size was kept 4m x 0.75m. The harvesting was done on 15-06-2021.Data regarding different agronomic traits were recorded and hybrids with good performance were selected for on farm testing. The data are given in Tables below

Table 84: Results of Hybrid Maize Preliminary Yield Trial-1 (Spring 2021), Faisalabad

Sr. No	Hybrid	Yield ha/kg	Stand Count	50% Tasseling	50% Silking	Plant Height	Cob Height	Cobs Harvested
27	**YH-5427**	**13137**	**19.5**	**67.5**	**69**	**167.5**	**97.5**	**21**
18	FH-2019	12685	20	70	72	177.5	92.5	20
28	**P-1429**	**12479**	**19**	**66**	**68**	**190**	**80**	**19.5**
30	**NK-8441**	**12182**	**20**	**64**	**66.5**	**175**	**80**	**20**
26	**FH-1046**	**12119**	**18**	**68.5**	**70.5**	**177.5**	**100**	**18**
3	FH-1935	12088	21	67	68.5	180	90	21
19	FH-2020	11982	20	70	72	172.5	92.5	20
2	FH-1882	11020	18.5	66.5	68.5	185	92.5	17
24	FH-2025	10854	20.5	66.5	68.5	177.5	85	18.5
22	FH-2023	10769	20	65	67.5	182.5	85	20
23	FH-2024	10693	20	64	66.5	190	102.5	19
14	FH-2014	10582	19.5	66	68	150	90	20
25	FH-2026	10422	20.5	67	68.5	182.5	92.5	21
4	FH-1937	10259	19	67.5	69.5	162.5	92.5	17
5	FH-1955	10108	19.5	68.5	70.5	147.5	70	18
15	FH-2016	10079	20	67	69	172.5	97.5	20
1	FH-1724-1	9699	19.5	67.5	69.5	157.5	90	17.5
16	FH-2017	9469	20.5	68.5	70.5	170	90	17
6	FH-2003	9278	18	67.5	69.5	155	85	16.5
13	FH-2013	9000	20.5	67	69	140	75	19
21	FH-2022	8988	20	67.5	69.5	152.5	70	17.5
17	FH-2018	8802	20	68.5	70.5	192.5	87.5	17.5
12	FH-2012	8695	20	69.5	71.5	152.5	80	19
8	FH-2005	8560	21	70.5	73	145	85	18
11	FH-2009	8398	19.5	69	71	147.5	87.5	18
7	FH-2004	8180	19.5	71	73.5	165	95	19.5
20	FH-2021	8113	19.5	69	71.5	160	87.5	17.5
29	DK-6724	8027	20	65.5	67.5	175	87.5	15
9	FH-2006	7237	18.5	69.5	71.5	150	75	18
10	FH-2008	7195	19	71	73	155	90	16
CV%		**14.27**	**NS**	**1.21**	**1.9**	**NS**	**NS**	**NS**
CD		**2748.4**	**3.5169**	**1.8088**	**2.9418**	**30.894**	**32.748**	**3.123**

The data presented in the Table 84 showed statistically significant differences in grain yield due to hybrids. Local hybrid FH-2019 ranked 2nd by giving grain yield of 12685 kg/ha after local check hybrid YH-5427(13137 kg/ha) but surpassed other check hybrids P-1429 (12479 kg/ha), NK-8441 (12182 kg/ha) & FH-1046 (12119 kg/ha) in grain yield. Days to 50% tasseling and 50% silking were showing statistically significant differences. The maximum days to tasseling (71) and silking (73.5) were taken by local hybrids FH-2004. Non Significant differences were observed for plant height and cob height. Number of plants and cobs harvested per plot were showing statistically non-significant differences too.

Table 85: Results of Hybrid Maize Preliminary Yield Trial-2 (Spring 2021), Faisalabad

E. No	Hybrid	Yield ha/kg	Stand Count	50% Tasseling	50% Silking	Plant Height	Cob Height	Cobs Harvested
28	**P-1429©**	**13348**	**21**	**65.5**	**68**	**195**	**80**	**22**
21	FH-2047	13250	20.5	65	67	175	92.5	20.5
14	FH-2040	13183	21	67.5	69.5	185	87.5	23.5
10	FH-2036	12951	19.5	66	68.5	172.5	90	19
7	FH-2033	12946	21	69.5	71.5	175	90	20
13	FH-2039	12826	22.5	66.5	68.5	177.5	90	23
26	**FH-1046©**	**12639**	**18**	**68.5**	**70.5**	**170**	**92.5**	**18.5**
9	FH-2035	12450	20.5	66	68	177.5	90	18
16	FH-2042	12055	20	66.5	68.5	170	90	20
27	**YH-5427©**	**11988**	**18**	**69**	**71**	**182.5**	**100**	**20.5**
4	FH-2030	11659	19.5	66.5	68.5	170	87.5	22
18	FH-2044	11581	19.5	68	70	180	87.5	17
25	FH-2051	11559	21	69	71	167.5	77.5	20
17	FH-2043	11338	16	68.5	70.5	187.5	95	16
30	**NK-8441©**	**11312**	**18.5**	**67**	**69**	**177.5**	**90**	**21.5**
29	**DK-6724©**	**11075**	**21.5**	**65.5**	**67.5**	**180**	**75**	**19.5**
12	FH-2038	11029	21	66	68	170	87.5	21.5
24	FH-2050	11025	21	66.5	68.5	165	92.5	17.5
6	FH-2032	10988	19.5	67.5	69.5	180	100	17
15	FH-2041	10819	20.5	67.5	69.5	177.5	87.5	20
5	FH-2031	10486	20.5	68	70	182.5	92.5	17
1	FH-2027	10439	20	66.5	68	162.5	80	19
22	FH-2048	10434	21	65	67.5	160	82.5	18.5
19	FH-2045	10240	21	69	70.5	177.5	87.5	21.5
23	FH-2049	9931	18.5	67.5	69.5	177.5	87.5	21
8	FH-2034	9910	18	69	71	177.5	100	16
20	FH-2046	9602	18.5	68	70	170	90	19
2	FH-2028	9040	16	68.5	70.5	182.5	95	15.5
11	FH-2037	8776	19.5	69.5	71.5	177.5	102.5	16
3	FH-2029	8707	19	66.5	69	160	67.5	16.5

The data presented in the Table 85 showed statistically significant differences in grain yield due to hybrids. Commercial check hybrid P-1429 (13348 kg/ha) out yielded. Local hybrid FH-2047 ranked 2nd by giving grain yield of 13250 kg/ha followed by FH-2040 (13183kg/ha). The local check FH-1046 (12639 kg/ha) and other check YH-5427 (11988kg/ha) remained at 7th and 10th positions. Days to 50% tasseling and 50% silking showed statistically significant differences. While non-significant differences were observed for plant height and cob height. Maximum plant height was attained by P-1429 (195 cm) with a cob height of 80 cm while hybrid FH-2047 and FH-2048attained minimum days to 50% tasseling (65) and silking of 67 and 67.5. Number of plants and cobs harvested per plot showed statistically significant differences.

Table 86: Results of Hybrid Maize Preliminary Yield Trial-3 (Spring 2021), Faisalabad.

Sr No.	Hybrid	Yield ha/kg	Stand Count	50% Tasseling	50% Silking	Plant Height	Cob Height	cob harvested
28	**P-1429**	**14832**	**21.5**	**66**	**68**	**190**	**160**	**21.5**
30	**NK-8441**	**13139**	**22**	**65**	**67**	**177.5**	**160**	**21.5**
29	**DK-6724**	**13124**	**20.5**	**65**	**67**	**185**	**165**	**20.5**
19	FH-2070	12746	19.5	66.5	68.5	170	155	19.5
22	FH-2073	12412	20	68	70	167.5	160	20.5
16	FH-2067	12212	19.5	70.5	72.5	170	165	24
5	FH-2056	12199	21	67	69	175	175	19
24	FH-2075	11940	20.5	66	68	175	190	20
23	FH-2074	11900	20.5	67	69	170	160	18.5
27	**YH-5427**	**11724**	**19**	**68.5**	**35.5**	**177.5**	**190**	**17.5**
20	FH-2071	11675	18.5	67.5	69.5	175	130	20
25	FH-2076	11438	18.5	66.5	68.5	170	155	20.5
4	FH-2055	11163	19	68	70	177.5	160	19.5
10	FH-2061	10986	20.5	69	71	162.5	165	18.5
7	FH-2058	10838	17.5	69.5	72	190	180	20
6	FH-2057	10795	18.5	69.5	71.5	190	180	16.5
12	FH-2063	10773	20.5	66	68	155	135	18.5
3	FH-2054	10627	20	66	68	180	160	16
26	**FH-1046**	**10623**	**17.5**	**70**	**72**	**182.5**	**190**	**19**
2	FH-2053	10470	17.5	70	72	165	160	17.5
18	FH-2069	10359	16.5	69.5	71.5	175	180	19
1	FH-2052	10197	17	68	70	172.5	170	16.5
21	FH-2072	9948	17.5	67	69	177.5	150	17.5
15	FH-2066	9823	20	71	73	167.5	170	18
17	FH-2068	9627	19	71.5	73.5	175	150	19
9	FH-2060	9555	17.5	67	69	177.5	145	20
11	FH-2062	9386	19	70	72	170	180	16
8	FH-2059	8981	19	67.5	69.5	180	160	17.5
13	FH-2064	8468	20.5	69.5	72	147.5	155	19.5
14	FH-2065	8257	16.5	72.5	75.5	177.5	220	16

The data presented in the Table 86 showed statistically significant differences in grain yield due to hybrids. Local hybrid FH-2070 gave the highest grain yield of 12746 kg/ha followed by FH-2073 (12746kg/ha). The local check FH-1046 gave 11815 kg/ha and other check YH-5427 gave 11724 kg/ha yield. Days to 50% tasseling and 50% silking were showing statistically significant differences. While non-significant differences were observed for plant height and cob height. Maximum plant height was attained by P-1429 (190 cm) with a cob height of 160 cm. Local hybrid FH-2067attained maximum days to 50% tasseling 70.5 and days 50% silking of 72.5. Number of plants and cobs harvested per plot were showing statistically non- significant differences.

Table 87: Results of Hybrid Maize Preliminary Yield Trial-4 (Spring 2021), Faisalabad.

Entry No.	Entry Name	Yield ha/kg	Stand Count	50% Tasseling	50% Silking	Plant Height	Cob Height	cob harvested
20	**NK-8441**	**12332.02**	**21**	**66.5**	**69**	**180**	**70**	**22**
15	**FH-988**	**10543.51**	**18.5**	**71.5**	**74**	**150**	**60**	**19**
17	**FH-5427**	**12369.69**	**18.5**	**68.5**	**69**	**160**	**75**	**19**
14	FH-2080	12898.36	21.5	67.5	69	165	80	19
13	FH-2053	10243.84	14	68	67	145	80	15
12	FH-2052	6364.671	9	70	71	180	90	10
11	FH-2031	10059.46	16.5	69.5	70	190	95	16
10	FH-2017	11202.27	18.5	66.5	68	160	80	18
9	FH-1954	9961.603	19	66	67	180	85	15
8	FH-1943	8027.522	20	69	68	165	80	17
7	FH-1942	9840.584	18	71	73	190	110	18
6	FH-1931	9758.509	18	71	73	170	95	18
5	FH-1865	13347.81	21.5	68	71	155	85	22
4	FH-1743-1	11769.15	18.5	65.5	67	160	85	19
3	FH-1731	11019.36	20	67	71	180	100	19
2	FH-1682	11337.02	19	65	67	150	80	17
1	FH-1606	12102.68	18	66.5	69	170	75	18
18	FH-1429	11677.34	18	67	71	190	85	16
16	**FH-1046**	**10963.38**	**17**	**69**	**71**	**165**	**95**	**16**
19	**DK-6724**	**11898.59**	**20.5**	**65.5**	**67**	**170**	**80**	**19**

The data presented in the Table 87 showed statistically significant differences in grain yield due to hybrids. Local hybrid FH-2080 gave the highest grain yield of 12898.36 kg/ha followed by FH-5427 (12369.69 kg/ha). Days to 50% tasseling showed statistically significant differences. While non-significant differences were observed for 50% silking, plant height and cob height. Maximum plant height was attained by three local hybrids FH-2031, FH-1942 and FH-1429 (190 cm) with a cob height of 95cm, 110cm and 85 cm respectively. Local hybrid FH-988 attained maximum days to 50% tasseling (71.5) and silking (74) while FH-1682 attained minimum days to 50% tasseling (65) and days to 50% silking of 67. Number of plants and cobs harvested per plot showed statistically non- significant differences.

6. National Uniform Hybrid Maize Yield Trial 1st Year (Spring 2021)

This trial comprised of one hundred twenty nine (129) entries. Its sowing date was 22-02-2021. The trial was laid out in RCB design with three replications. The plot size was kept 4m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting was done on 14-06-2021.Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in the following Table

Table 88: Results of National Uniform Hybrid Maize Yield Trial 1st year (Spring 2021) Faisalabad

Sr. No	Hybrid Code	Grain Yield/ha	Stand Count	50% Silking	Plant Ht. (cm)	Ear Ht. (cm)	Plant harvested	Ear harvested
1	65	12422	65	67	101	75	40	41
2	116	12119	65	67	202	95	39	40
3	30	11294	67	69	192	90	40	41

4	50	11238	65	67	187	92	40	42
5	45	11042	65	67	182	65	37	39
6	123	11004	63	65	155	90	33	36
7	61	10926	63	65	197	100	39	40
8	58	10848	65	66	200	75	39	39
9	117	10784	66	68	207	110	35	36
10	66	10731	66	68	190	82	33	34
11	39	10708	65	67	175	77	38	41
12	10	10640	63	66	207	77	40	41
13	54	10581	65	67	170	70	40	42
14	128	10489	63	65	170	57	37	39
15	44	10488	63	65	225	107	38	39
16	17	10477	65	67	177	75	38	39
17	68	10309	65	67	180	85	39	40
18	48	10200	68	70	232	105	35	35
19	62	10084	65	67	185	75	38	38
20	4	10020	64	67	190	80	38	40
21	63	9997	67	69	152	82	38	40
22	108	9979	65	67	182	87	40	41
23	51	9969	64	66	182	77	40	40
24	23	9944	67	69	205	102	38	40
25	113	9881	65	67	190	87	38	40
26	15	9879	66	68	185	72	34	36
27	19	9878	67	69	205	87	35	35
28	56	9851	65	67	212	87	36	36
29	31	9836	65	67	177	90	39	39
30	5	9782	65	68	205	92	40	42
31	12	9753	66	69	187	85	33	34
32	32	9711	65	67	162	92	38	38
33	119	9665	64	66	205	105	40	43
34	8	9661	64	66	182	72	36	38
35	124	9564	63	65	127	62	34	39
36	27	9562	65	67	190	92	35	37
37	76	9543	67	68	202	105	33	36
38	78	9524	65	67	207	100	40	40
39	105	9505	61	63	142	67	39	40
40	55	9441	65	67	205	102	35	35
41	115	9437	66	68	182	92	39	39
42	60	9431	62	65	200	97	33	36
43	93	9426	64	66	182	72	38	38
44	26	9423	65	67	210	92	35	36
45	100	9379	65	66	192	92	40	40
46	127	9361	66	68	152	72	37	37
47	35	9336	67	70	212	102	34	36

48	16	9325	66	68	185	87	37	39
49	126	9288	66	69	152	52	36	36
50	47	9285	65	67	207	105	37	37
51	49	9266	65	67	187	80	40	40
52	129	9247	65	67	162	72	40	40
53	80	9189	64	66	187	87	39	39
54	3	9174	67	69	192	75	40	41
55	29	9147	65	67	207	87	36	38
56	84	9126	62	65	187	50	36	38
57	109	9109	66	68	190	97	40	41
58	122	9099	66	68	172	92	34	35
59	18	9086	67	69	182	85	37	37
60	77	9037	65	67	177	107	38	38
61	96	9021	65	67	162	52	36	38
62	82	8983	65	66	172	85	40	42
63	73	8924	65	67	185	92	40	40
64	2	8903	65	67	157	65	33	34
65	74	8879	67	69	162	87	36	36
66	42	8872	62	65	190	82	35	37
67	102	8870	65	67	200	105	35	35
68	69	8868	63	65	185	82	38	38
69	33	8863	68	70	210	85	33	35
70	22	8824	66	68	182	82	38	40
71	1	8824	64	66	190	72	34	34
72	83	8818	65	67	162	87	40	41
73	24	8810	65	67	200	100	33	33
74	92	8755	66	68	195	82	37	37
75	46	8751	67	69	192	85	28	30
76	64	8658	65	68	180	72	39	40
77	121	8645	66	68	182	82	37	37
78	94	8630	68	70	202	87	37	39
79	28	8619	64	66	207	87	35	37
80	70	8487	65	67	195	82	33	33
81	59	8443	63	65	137	45	31	33
82	13	8392	66	68	172	92	34	35
83	118	8369	63	65	162	70	34	36
84	79	8318	65	67	207	87	34	34
85	86	8286	65	67	182	82	37	37
86	114	8286	62	63	200	102	37	39
87	25	8178	64	66	190	82	33	33
88	40	8113	68	70	182	82	40	42
89	14	8095	68	70	202	95	36	36
90	41	8011	69	71	167	77	35	37
91	20	7943	65	68	187	77	32	32

92	36	7943	68	70	207	98	35	38
93	87	7913	63	65	195	77	38	38
94	111	7858	62	64	157	87	36	36
95	97	7831	66	68	177	67	32	32
96	7	7650	65	67	165	65	30	30
97	110	7642	64	66	157	80	32	32
98	125	7618	66	68	177	85	23	23
99	21	7494	64	66	167	87	33	35
100	101	7445	67	69	180	82	31	31
101	11	7363	67	69	182	85	38	38
102	112	7360	67	69	175	75	37	37
103	71	7330	63	65	150	82	32	34
104	67	7263	65	67	160	72	34	35
105	103	7234	60	62	182	77	37	37
106	104	7132	65	67	137	67	31	31
107	6	7108	65	67	152	57	34	36
108	95	6988	64	66	200	102	27	28
109	9	6912	65	67	212	110	31	31
110	120	6884	66	68	200	82	38	40
111	98	6874	64	66	205	107	34	34
112	89	6870	65	67	202	97	31	31
113	81	6831	65	67	82	45	35	37
114	57	6827	67	69	202	77	29	29
115	72	6680	62	64	155	80	30	30
116	34	6667	65	67	205	102	25	25
117	106	6634	66	68	172	102	30	30
118	99	6597	66	69	180	90	35	35
119	53	6547	67	69	137	57	30	32
120	85	6404	65	67	132	55	35	35
121	75	6106	65	67	157	87	32	32
122	91	6002	65	66	172	75	30	30
123	88	5963	65	67	142	57	27	29
124	43	5938	68	70	162	82	33	34
125	107	5901	61	63	127	57	34	34
126	90	5533	65	67	192	92	32	32
127	37	5526	65	67	172	82	24	26
128	38	4576	66	69	177	92	23	25
129	52	3655	65	67	167	85	13	15
CV%		**14.12**	**10.19**	**2.93**	**2.83**	**5.76**	**11.92**	**11.49**
CD %		**2098.8**	**5.96**	**3.33**	**3.30**	**17.16**	**6.53**	**6.14**

Data presented in Table 88 revealed that statistically significant differences exist for grain yield kg/ha among entries included in this trial. Entry 12 gave maximum grain yield of 15231 kg/ha followed by entry 65 (12422 kg/ha). Entry 52 was lowest yielder with grain yield 3655 kg/ha at this station. Entries 102 had taken minimum days to start silking (62). Entry 48 revealed maximum plant height (232cm). Statistically significant differences were found for all traits.

7. National Uniform Hybrid Maize Yield Trial 2nd year Spring 2021, Faisalabad.

This trial also comprising 81 entries was sown on 22-02-2021. The trial was laid out in RCB design with three replications. The plot size was kept 4m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 16-06-2021. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table below

TABLE 89: Results of National Uniform Hybrid Maize Yield Trial 2nd year (Spring 2021), Faisalabad

Sr. No	Hybrid Code	Yield (Kg/ha)	Days to Flowering (Male)	Days to Flowering (Female)	Plant height (cm)	Ear harvested	Plants Harvested	No. of Ears Harvested
1	12	10094	66	68	182.5	80	37	37
2	7	9755	63	65	182.5	80	40	40
3	44	9636	67	69	185	80	40	40
4	39	9369	65	67	187.5	70	35	35
5	28	9351	71	73	177.5	75	34	34
6	55	9311	65	67	192.5	100	35	36
7	56	9270	61	63	152.5	62.5	36	36
8	6	9062	66	68	180	92.5	40	41
9	42	8994	70	71	180	77.5	36	36
10	41	8889	67	70	200	92.5	35	35
11	31	8855	62	65	170	70	35	35
12	10	8853	67	68	192.5	92.5	35	35
13	57	8848	66	68	162.5	80	36	36
14	33	8836	66	68	162.5	67.5	35	35
15	36	8825	68	70	180	82.5	39	39
16	49	8793	68	70	182.5	77.5	38	38
17	43	8771	70	67	190	87.5	35	36
18	14	8748	67	69	142.5	70	36	37
19	37	8669	68	70	187.5	70	33	33
20	60	8668	66	68	170	70	30	30
21	35	8583	67	68	162.5	70	37	37
22	48	8469	65	66	172.5	70	38	38
23	38	8356	70	72	180	75	36	36
24	29	8284	64	66	125	55	33	33
25	26	8230	64	65	142.5	70	40	40
26	5	8018	66	67	170	80	37	37
27	52	8000	68	70	172.5	87.5	34	34
28	13	7981	64	66	172.5	80	38	38
29	24	7911	63	65	160	72.5	35	35
30	16	7882	66	68	160	77.5	32	32

31	27	7817	68	70	172.5	67.5	39	39
32	30	7792	63	65	180	80	37	38
33	1	7791	66	68	162.5	70	34	35
34	8	7608	66	68	187.5	82.5	32	32
35	25	7507	67	70	170	82.5	38	38
36	40	7496	70	72	185	82.5	34	34
37	53	7367	68	70	180	90	36	37
38	62	7047	63	65	180	77.5	36	36
39	18	7025	68	70	162.5	80	36	37
40	47	6976	66	68	170	80	35	35
41	23	6899	66	68	172.5	75	35	35
42	54	6873	64	66	152.5	72.5	33	33
43	51	6845	65	67	185	90	28	28
44	50	6832	66	68	182.5	82.5	25	25
45	22	6808	68	70	160	52.5	33	33
46	63	6707	71	73	162.5	72.5	32	32
47	45	6579	68	71	190	72.5	31	31
48	59	6550	68	70	172.5	80	34	34
49	4	6452	68	70	127.5	67.5	33	33
50	3	6435	69	71	142.5	67.5	29	29
51	61	6433	70	72	160	72.5	35	35
52	15	6369	68	70	167.5	82.5	24	24
53	9	6302	61	63	142.5	62.5	28	28
54	20	6258	69	71	182.5	82.5	27	27
55	46	6210	66	68	142.5	52.5	36	36
56	32	6198	65	67	170	75	32	32
57	2	6161	67	69	177.5	72.5	26	26
58	34	6079	62	64	120	62.5	28	28
59	11	5879	67	69	187.5	77.5	26	26
60	58	5703	65	67	145	70	29	29
61	19	5623	67	69	187.5	90	34	34
62	17	5170	69	70	187.5	75	14	21
63	21	5016	66	68	142.5	52.5	23	23
CV %		**11.08**	**4.68**	**0.86**	**1.22**	**6.97**	**10.86**	**7.64**
CD %		**1487.3**	**2.8527**	**1.0749**	**1.5689**	**NS**	**NS**	**4.154**

Data presented in Table 89 showed significant differences for grain yield kg/ha for 63 entries. The Entry coded as 12 out yielded with grain yield 10094 kg/ha followed by entry '7' (9755 kg/ha). Entry coded as '21' was lowest yielder with grain yield 5016 kg/ha. Statistically non-significant differences were observed for plant height and ear height.

National Uniform Varietal (OPV) Maize Yield Trial (Spring2021)

This trial was sown on 17-02-2021, with seven (7) entries. The trial was laid out in RCB design with two replications. The plot size was kept 4m x 1.5m. Standard agronomic

and plant protection measures were carried out in the crop. Harvesting of trial was done on 16-06-2021.Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table below

TABLE 90: Results of National Uniform White (OPV) Maize Yield (Spring 2021), Faisalabad

Sr. No	Hybrid code	Yield (KG/ha)	Stand count	Days to flowering (Female)	Plant height (CM)	Ear height (CM)	Plants harvested	No of ears harvested
1	1	4045.874	60	65	167	102	34	34
2	6	3264.333	66	70	137	77	29	29
3	5	2479.916	63	66	168	82.5	29	29
4	3	2286.401	63	63	143	77	26	26
5	2	2057.905	67	75	143	80	24	24
6	7	1463.862	60	65	162	107	34	20
7	4	1335.048	73	69	160	88	17	17

Data presented in Table 90 showed non-significant differences for grain yield kg/ha due to varieties. The Entry coded as '1' out yielded with a grain yield of 4045.874 kg/ha followed by '06' (3264.333kg/ha). The entry coded as '04' was lower yielder with a grain yield of 1335kg/ha. Statistically significant differences were observed for all traits of ten entries.

PARB PROJECTS

1. Acceleration of Maize Breeding through Inducer Lines Mediated Doubled Haploids (PARB No. 900)

In spring 2021, 20 DH at MRS, Fsd were successfully maintained and multiplied.

2. Nutrition enhancement of crops, fruits, vegetables and their products under climate change scenario (PARB No. 904 VI)

Parental lines of 20 hybrids were maintained successfully during spring 2021.

SEED PRODUCTION:

In two different isolated blocks composite variety were planted for double top cross seed production. Double top cross seed was collected from female line and composite variety seed from male line.

TABLE 91: SEED PRODUCTION, SPRING-2021, FAISALABAD

Sr. No.	Entry	Seed production (Kgs)
1	DTC	535
2	Malka-16 (OPV)	755

MILLETS RESEARCH STATION, RAWALPINDI

Season and Its Effect:

Meteorological data of Millets Research Station, Rawalpindi for the financial year 2019-2020 and 2020-2021 are given below. During the year 2020-2021 954.5 mm rain was received (up to 30 May 2021) compared with 2019-2020 (1465.8mm). Heavy rains from mid July to mid August badly affected the germination of Pearl millet crop which delayed flowering and hence maturity. Gap filling/thinning could not be done due to which crop stand was not satisfactory. Lodging was also observed in some research trials.

Table 92: Meteorological Data for the Financial Year 2019-20 and 2020-21

Sr. No.	Month	Temperature ^{o}C				Rainfall (mm)	
		Maximum		Minimum			
		(2019-20)	(2020-21)	(2019-20)	(2020-21)	(2019-20)	(2020-21)
1	July	47.0	42	23.0	21	231.0	221.8
2	August	38.0	39	21.0	22	325.5	365.1
3	September	37.0	37	21.0	18	132.0	87.9
4	October	31.0	36	14.0	09	41.5	0.0
5	November	29.0	32	7.0	05	53.0	108.5
6	December	24.0	25	1.0	01	12.5	22.5
7	January	20.0	23	2.0	01	102.0	13.2
8	February	27.0	29	3.0	02	28.0	5.1
9	March	28.0	32	7.0	09	214.0	51.9
10	April	33.0	39	12.0	09	87.5	41.0
11	May	40	43	15	17	195.1	37.5
12	June	41	-	20	-	43.7	0.0
					Total	**1465.8**	**954.5**

RESEARCH WORK DONE:

Following research work on Pearl millet and maize was conducted during the year 2020-21 at Millets Research Station, Rawalpindi.

Pearl Millet

1. Crossing Block of Pearl Millet

Forty eight Pearl millet germplasm lines were sown on 16-07-2020 in strips. Each genotype consisted of two rows of five meter length. Inter row and inter plant distances were kept as 75 cm and 20 cm respectively. Seed was harvested on 24-10-20 and retained for future utilization in the breeding program for the development of dual purpose variety.

Twenty successful fresh crosses between five diverse Pearl millet genotypes were made, harvested and seed was retained to raise F_1 population during kharif- 2021.

2. Development of Dual Purpose Pearl Millet Variety

Five breeding populations (F_1, F_2, S_1, S_2 and S_3) were sown in strips in mid July from 16.07.2020 to 19.07.2020. Plant to plant and row to row distances were kept as 20 cm and 75 cm respectively. F_1 crosses were selfed and off type plants were rogued out. Phenotypically superior plants selected from F_2 population were self-pollinated, harvested

and seed was retained. Phenotypically superior and identical plants from S_1 and S_2 populations were self-pollinated and seed was bulked for each line separately. Thirteen uniform lines from S_3 population were selected for evaluation in micro trials. The detail is given in the Table below**.**

Table 93: Pearl Millet Populations Studied during Kharif- 2020

S. No.	Population	Studied	Selected plants/lines	Selection for Micro Trial
1	F_1	20	20	-
2	F_2	20	39 single plants	-
3	S_1	38	60	-
4	S_2	32	39	-
5	S_3	25	13	13 lines

3. Pearl Millet Micro Yield Trial –I

The trial, comprising of fourteen Pearl millet genotypes, was sown on 17-07-2020 using randomized complete block design with three replications. The plot size was kept 5m x 2.25m with row to row spacing of 75 cm and plant to plant spacing of 20 cm respectively. Harvesting was completed on 21-10-2020. The observations recorded on different plant parameters are summarized in the Table given below.

Table 94: Results of Pearl Millet Micro Yield Trial - I Kharif- 2020

R. No.	Varieties	Grain Yield (kg/ha)	Plants Harvested	Stalk Yield (Kg/ha)	Days to 50% Flowering	Plant Height(cm)
1.	YBH-278	3253a	71	3028	50	264
2.	19RBS-56	3125a	70	2939	55	245
3.	19RBS-57	2424b	70	2471	55	263
4.	19RBS-59	2239bc	70	2907	50	252
5.	19RBS-53	2227bcd	68	2622	56	229
6.	19RBS-64	1896cde	67	2587	54	256
7.	19RBS-60	1873cde	70	3081	53	282
8.	19RBS-62	1826de	69	2631	60	251
9.	19RBS-58	1813e	68	2702	56	241
10.	YBS-98	1736e	68	2506	52	238
11.	19RBS-54	1633e	68	2874	60	262
12.	19RBS-61	1602e	68	3244	58	294
13	19RBS-55	1516e	70	2634	59	226
14	19RBS-63	1064f	68	3185	58	297
CV %		8.82	4.07	6.40	1.75	2.08
LSD 1%		403.64	6.36	408.9	2.19	12.14

The results presented in Table 94 revealed highly significant genetic differences among genotypes for parameters like grain and stalk yield, days to 50% flowering and plant height except plants harvested. The genotypes, YBH-278 and 19RBS-56 gave maximum grain yield of 3253 kg/ha and 3125 kg/ha respectively. While the genotype, 19RBS-63 gave minimum yield of 1064 kg/ha. The genotype 19RBS-61 gave maximum stalk yield of 3244 kg/ha followed 19RBS-60 (3081 kg/ha).

4. Pearl Millet Micro Yield Trial -II

The trial, comprising of thirteen Pearl millet genotypes, was sown on 17-07-2020 using randomized complete block design with three replications. Each plot consisted of three rows of five meter length with row to row and plant to plant spacing of 75cm and 20 cm respectively. Harvesting was completed on 22-10-2020. The observations recorded on different plant parameters are summarized in the Table 95.

Table 95: Results of Pearl Millet Micro Yield Trial- II Kharif, 2020

R. No.	Entries	Grain Yield (kg/ha)	Plants Harvested	Stalk Yield (kg/ha)	Days to 50% Flowering	Plant Height (cm)
1.	18RBS-50	2493a	69	2415	57	251
2.	YBS-98	2111ab	67	2711	51	262
3.	18RBS-42	2064bc	69	2705	49	254
4.	18RBS-51	2002bc	70	2758	56	270
5.	18RBS-49	1998bc	69	2981	59	284
6.	18RBS-46	1951bc	69	2447	50	236
7.	18RBS-44	1919bcd	69	2433	56	234
8.	18RBS-52	1911bcd	68	2272	57	243
9.	YBH-278	1862bcd	67	3093	57	265
10.	18RBS-48	1694cd	69	2764	56	254
11.	18RBS-47	1689cd	67	2696	50	253
12.	18RBS-43	1673cd	68	2939	50	276
13	18RBS-45	1511d	69	2471	57	231
CV %		9.37	3.77	6.49	1.73	2.03
LSD 1%		409.45	5.90	395.28	2.14	11.83

The results presented in the above table 95 revealed highly significant genetic differences for all the parameters like grain and stalk yield, days to 50% flowering, plant height and plants harvested. The genotype 18RBS-50 gave maximum grain yield of 2493kg/ha followed by YBS-98 (2111 kg/ha) and 18RBS-42 (2064 kg/ha) respectively. 18RBS-50 excelled both the checks regarding grain yield. This genotype may prove best for the barani areas due to medium stature, medium maturity and high grain yield.

5. Pearl Millet Varietal Yield Trial

Twelve pearl millet genotypes received from Maize and Millets Research Institute, Yusafwala were tested under rain fed conditions for grain yield and other attributes at Millets Research Station Rawalpindi. The experiment was sown on 17-07-2020 according to randomized complete block design with three replications. The plot size was 11.25m^2 with three rows of five meter length of each genotype. Row to row and plant to plant distances were kept as 75cm and 20cm respectively. The harvesting was completed on 22-10-2020. The data of various plant parameters were recorded and the summary of the results is presented in the Table 96.

Table 96: Results of Pearl Millet Varietal Yield Trial Kharif 2020

R. No.	Verities	Grain Yield (kg/ha)	Plants Harvested	Days to 50% Flowering	Plant Height (cm)
1.	YBH-278	3397a	68	60	254
2.	86M88(c)	2814b	69	59	187
3.	YBS-89	2498bc	68	58	267
4.	YBS-94	2478bc	65	60	264
5.	YBS-83	2187cd	67	60	282
6.	YBS-95	2069cde	67	58	279
7.	YBS-98(c)	1934def	69	57	253
8.	YBS-93	1888def	68	60	261
9	YBS-92	1748def	65	57	240
10.	YBR-5	1630ef	67	61	249
11	18-BY	1546fg	68	64	284
12	YBS-70	1147g	69	63	184
CV %		9.29	2.71	1.74	2.78
LSD 1%		451.33	4.22	2.40	15.98

Analysis of variance of the data presented in Table 96 showed highly significant differences among genotypes for grain yield, days to 50% flowering, plant height except plants harvested. Table-5 revealed that the check hybrid YBH-278 gave maximum grain yield of 3397 kg/ha followed by 86M88(c) (2814 kg/ha). Minimum number of days (57) to 50% flowering was taken by YBS-98(c) and YBS-92 while maximum number of days to 50% (64 days) flowering was taken by 18-BY and YBS-89 significantly differed with the check variety YBS-98 regarding grain yield.

6. Adaptability/National Uniform Millet Grain Yield Trial Kharif 2020

The experiment comprised of thirty one Pearl millet hybrids/varieties, received from National Agricultural Research Centre, Islamabad was sown on 16-07-2020 at Millets Research Station, Rawalpindi, during Kharif 2020. Randomized complete block design with two replications was used to lay out the experiment. Each plot consisted of two rows of five meter length spaced at 75 cm. Plant to plant distance was kept as 20 cm. The experiment was harvested on 26-10-2020. The data recorded on different plant parameters were sent to the quarter concerned. Results received from the national coordinator are given below:

Table 97: Results of Adaptability/National Uniform Millet Grain Yield Trial Kharif 2020

R. No.	Hybrid/ variety	Yusaf wala	Dadu, Sindh	Rawal pindi	Islama bad	Layyah	Bahawal pur	Harappa	D.G Khan	D. I. Khan	Mean
1.	SHAHENSHAH	4664	3467	1973	2633	4105	3067	3247	1778	2215	3016
2.	N-95	4500	3080	2320	2556	3539	2898	2789	1644	1778	2789
3.	Global	4584	3422	2513	2589	4071	2978	2854	1911	1649	2952
4.	SHAHANSHA (Green Gold Agri.)	4832	3080	1780	2489	3773	2711	2220	1689	2177	2750
5.	HERCULES	4592	3067	1940	2256	3671	2467	2499	2978	1202	2741
6.	LG-98	5144	2858	1440	2661	4466	3289	2115	1867	2068	2879
7.	SD-55S20	5232	3169	2233	2683	4396	3333	3304	1733	1807	3099
8.	SD-55S90	4336	3200	2520	2500	3750	2333	2938	1600	2581	2862
9.	SD-55S95	4344	3391	2207	2878	3755	2756	3079	2222	1100	2859
10.	RS-MASTER	5040	3436	1900	2794	4121	3000	2316	1733	1469	2868
11.	MUGHAL-E-AZAM	5144	3822	2233	2622	4511	2622	3170	2267	2436	3203

12.	Fareed-01	4840	3867	2580	2611	3843	3933	2751	1467	2466	3151
13	AAS-7868	3280	3778	1660	2478	2785	3267	2407	1556	2043	2584
14	HP-233	5176	3956	1993	2450	4715	4133	3278	1733	2160	3288
15	86M20	5440	3867	1860	2506	5143	4578	3140	2267	1888	3410
16	86M38	5176	4133	2047	3028	5509	4600	2370	1778	2774	3490
17	ML-72	3624	4000	2367	2867	2517	3800	1413	1689	2182	2718
18	JUMBO	3288	3822	2120	2667	2196	4044	1857	-	1551	2693
19	Fighter-72	3796	3600	2447	2944	1697	3533	2589	-	1624	2779
20	HS long jump	4000	4267	3173	2556	3132	3467	1264	1333	1621	2757
21	Q.S-299	4544	3511	2267	2722	4316	3267	1257	2711	1694	2921
22	Rustam-King	3728	3111	1513	2472	3406	2756	1904	2311	1505	2523
23	DS-1122	3360	2889	1160	2783	2652	2800	1830	1778	1789	2399
24	YBS-98(CHECK)	3678	2947	1733	2350	2990	3267	673	2267	1940	2369
25	YBH-278	4248	3067	1500	2350	4669	4267	3207	2133	2047	3080
26	PM-61	3840	2502	1427	2422	3504	3667	2257	2533	1663	2654
27	PM-65	4336	3258	747	2289	3518	3933	2066	1733	1525	2676
28	G-127	3680	3378	1013	2083	2296	2200	1402	2400	1933	2235
29	14RBS-05	3292	2636	900	2144	2178	4044	1894	2578	2048	2425
30	16RBS-10	3508	3200	2113	2333	2276	2400	767	1822	2070	2142
31	16RBS-15	3544	3124	3124	2556	2720	2733	1353	2400	2295	2538

The results revealed that two advanced lines i.e., 16RBS-15 and 14RBS-05 of Millets Research Station, Rawalpindi excelled the check variety YBS-98 regarding mean grain yield across all locations

7 Pearl Millet ON - Farm Trial

Pearl millet on farm trial comprising of three entries was sown at three locations during Kharif 2020. At one location due to poor germination the trial was ploughed up by the farmer. The results of two locations are given as under.

Table 98: Results of on Farm Trials of Pearl Millet

S. No.	Location	Grain yield (kg/ha)		
		14RBS-05	YBS-98	YBH-278
1	Kahuta	325	305	492
2	Daultala	355	330	510

The table revealed that the hybrid YBH-278 gave maximum grain yield of 492kg/ha and 510kg/ha followed by 14RBS-05 which gave 325 kg/ha and 355kg/ha grain yield.

MAIZE

1. Preliminary White Maize Yield Trial

The experimental material, consisting of twenty five advance lines, was sown using strip design using two rows of each entry. The row to row and plant to plant distances were kept as 75cm and 25cm respectively. The crop condition was not according to the standard due to continuous heavy rains from mid July to mid August.

TABLE-99: Results of Preliminary White Maize Yield Trial

S. No.	Entry Name	Grain yield (kg/ha)	Days to tasseling	Days to Silking	Plant height (cm)	Cob Height (cm)
1	19RWM-01	479	54	57	203	89

2	19RWM-02	1385	57	59	208	79
3	19RWM-03	551	53	56	245	128
4	19RWM-04	299	55	58	239	93
5	19RWM-05	879	58	61	231	109
6	19RWM-06	885	52	55	226	106
7	19RWM-07	253	57	60	259	119
8	19RWM-08	377	54	57	237	110
9	19RWM-09	1959	53	56	266	121
10	19RWM-10	375	55	59	247	108
11	19RWM-11	364	57	60	225	107
12	19RWM-12	423	52	56	195	86
13	19RWM-13	768	53	56	235	106
14	19RWM-14	315	55	57	248	124
15	19RWM-15	127	58	61	217	93
16	19RWM-16	803	52	55	261	113
17	19RWM-17	772	57	60	229	97
18	19RWM-18	1156	53	55	205	87
19	19RWM-19	1313	58	60	188	79
20	19RWM-20	547	55	58	224	100
21	19RWM-21	388	60	62	254	132
22	19RWM-22	703	52	57	239	109
23	19RWM-23	809	57	59	229	87
24	19RWM-24	513	53	55	245	93
25	19RWM-25	464	57	60	177	82

The table revealed that the genotype 19RWM-09 gave the maximum yield of 1959kg/ha followed by 19RWM-02 (1385 kg/ha) and 19RWM -19 (1313 kg/ha).

MAIZE BREEDING SUB STATION, CHHARRAPANI (MURREE)
HYBRID MAIZE (*Zea mays* L.)

RESEARCH WORK:

During the spring maize crop season 2021, following research trials were received from the office of The Chief Scientist, Maize and Millets Research Institute, Yusafwala (Sahiwal) for sowing in the research area.

HYBRID MAIZE (*Zea mays* L.)

1. **Maintenance of Maize Inbred Lines**

   Sixteen (16) advance maize derivatives (Elite lines) were sown for maintenance and purification by hand pollination.

2. **Hybrid Constitution**

   Development of high yielding maize hybrids using temperature maize inbred lines are in process at MBSS, Chharrapani – Murree.

   Sowing of 15 single crosses and two check. Single crosses were constituted in spring 2020 using fifteen (15) advance maize derivatives (Elite lines) with one common male for evaluation in spring season 2021.

3. **Evaluation of single crosses.**

   Single crosses constituted in 5x5 diallel were evaluated with two checks for Combining ability studies

4. Derivation of Maize Inbred Lines

Four single crosses of maize were sown for derivation and advancement of generation by selfing through hand pollination.

Sowing was done on April 07, 2021 in the research area of Maize Breeding Sub Station, Chharrapani (Murree). Sowing was done with the help of dibbler keeping plant to plant and row to row distance of 23cm and 75cm respectively. Fertilizer was applied @ 142 – 75 N:P Kg/ha. Pre emergence weedicides (Primextra Gold) was sprayed after sowing. Furadan granules @ 08 Kg / acre against stem borer and insecticide coragen 20% SC @ 50 ml / acre against army worm was also applied.

During the cropping season proper rogueing was done to maintain purity of the inbred lines. All the maize breeding material after harvesting in August 2021 will be shifted to the Chief Scientist, Maize and Millets Research Institute, Yusafwala (Sahiwal) for further utilization in maize hybrid development program.

SORGHUM RESEARCH SUB-STATION, DERA GHAZI KHAN

Season and Its Effects

During the year 2020-21, 189.73 mm rainfall was received till May-2021as compared to the year 2019-20 (154.00) mm. Non availability of Irrigation water delayed the sowing of trials till the last week of July. Heavy rains in the end of July badly affected the germination of the trials and re-sowing of some trials was done also created hindrance in cultural operations and promoted the growth of different weeds as well.

Sr. No.	Month	Average Temperature C*				Rainfall (mm)	
		Maximum		Minimum			
		2019-20	2020-21	2019-20	2020-21	2019-20	2020-21
1	July	39.45	45.10	28.06	35.67	---	29.10
2	August	37.71	39.74	27.48	34.70	46.00	33.40
3	September	39.95	38.13	29.00	32.37	---	21.40
4	October	33.23	35.64	19.94	28.48	38.00	10.40
5	November	25.50	30.47	14.13	22.67	6.00	1.40
6	December	18.71	23.81	6.97	16.13	3.00	11.60
7	January	16.89	22.19	5.71	14.45	9.00	5.80
8	February	24.27	24.07	8.26	17.46	2.00	18.10
9	March	23.50	31.19	13.84	23.42	31.00	24.50
10	April	29.73	37.10	18.60	29.10	7.00	23.70
11	May	38.33	43.22	23.50	33.77	7.00	10.30
12	June	41.66	44.10	30.70	37.30	5.00	---
Total rainfall						154.00	189.73

SORGHUM

1. Sorghum Varietal Yield Trial, Kharif-2020

Ten entries of Sorghum were planted on 18.07.2020 to evaluate the promising lines/varieties for grain yield. The layout was done according to Randomized Complete Block Design with three replications in a plot size 5m x 1.5m. Plant to plant and row to row distances were kept 15cm and 75cm respectively. Standard agronomic and plant protection

measures were carried out in the experiment. The harvesting was done on 3.12.2020. The data recorded for different morphological traits are presented in table below

Table. 100 Results of Sorghum Varietal Yield Trial at D.G.Khan

S #	Entry Name	Grain Yield (kg/ha)	Crop Stand	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50% anthesis
1	**YSS-41**	2889a	46	25333	284	83
2	**YSS-18**	2622a	45	29222	266	84
3	**YSS-17**	2267b	46	24889	260	80
4	**YSS-16 c**	2222b	47	30555	313	85
5	**YSS-10**	2178b	44	38889	345	85
6	**YSS-38**	2000bc	45	28555	210	78
7	**YSS-42**	2000bc	44	25000	275	84
8	**YSS-31**	1778cd	46	27555	231	79
9	**YSS-23**	1600d	47	30111	375	85
10	**YSS-25**	1467d	47	35667	372	86
	CV%	9.51	2.07	2.23	6.48	0.98
	LSD 5%	342.78	N.S	1129.2	32.964	1.393

The results revealed that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 2889 kg/ha was recorded for the entry YSS-41while minimum grain yield (1467 kg/ha) was recorded for entry YSS-25. Highest stalk yield was recorded for the variety YSS-10 (38889 kg/ha) while minimum stalk yield 24889 kg/ha was observed for YSS-17. Maximum plant height (375 cm) was observed for variety YSS-23 while minimum plant height (210 cm) was observed for YSS-38. EntryYSS-25 took maximum 86 days to 50% anthesis while entryYSS-38 took minimum 78 days.

2. Sorghum Hybrid Yield Trial, Kharif- 2020

Seventeen (17) Hybrids and three checks of Sorghum were planted on 18.07.2020 to evaluate the best hybrids for grain yield. The layout was done according to Randomized Complete Block Design with three replications in a plot size 5m x 1.5m. Plant to plant and row to row distances were kept 15cm and 75cm respectively. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 14.12.2020. The data recorded for different morphological traits are presented in table below.

Table. 101 Results of Sorghum Hybrid Yield Trial at D.G.Khan

S #	Entry Name	Crop Stand	Grain Yield (Kg/ha)	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50% anthesis
1	YSH-145	39	2489a	27667	241	84
2	YSH-185	39	2444ab	11333	210	92
3	YSH-131	38	2356b	21778	176	82
4	YS-16 c	39	2222c	26222	265	85

5	Lasani	38	2089d	21667	203	84
6	YSH-175	38	2044d	23000	183	85
7	YSH-188	40	2044d	17667	208	86
8	YSH-132	39	1911e	24000	230	93
9	YSH-143	38	1778f	20444	183	79
10	YSH-197	40	1733fg	33778	213	82
11	YSH-224	40	1689fg	20000	243	86
12	YSH-216	38	1644gh	24667	252	92
13	YSH-193	38	1600h	32555	226	92
14	Fakhr-e-Punjab	39	1422i	19111	208	87
15	YSH-212	39	1378ij	22667	159	92
16	YSH-187	39	1289jk	20555	225	91
17	YSH-223	40	1244k	18000	228	85
18	YSH-178	39	1067 L	17556	136	91
19	YSH-205	38	1067 L	33889	227	86
20	YSH-200	40	889 m	20333	214	82
	CV%	1.61	4.19	2.20	1.08	0.88
	LSD 5%	N.S	119.02	832.57	3.76	1.27

The above table revealed that differences of means due to genotypes were significant for all traits under study. The maximum grain yield of 2489kg/ha was produced by hybrid YSH-145 while minimum grain yield (889 kg/ha) was recorded for YSH-200. Highest stalk yield was also recorded for the hybrid YSH-205 (33889 kg/ha) which is followed by the hybrid YSH-197(33778) kg/ha while minimum stalk yield was observed for YSH-185 (11333kg/ha). Maximum plant height was observed for entry YS-16 c (265cm)) while minimum plant height of 136 cm was observed for the hybrid YSH-178. YSH-132 took maximum 93 days to 50% anthesis while YSH-143 took minimum 79 days for 50 % anthesis.

3. National Uniform Sorghum (Grain) Yield Trial, Kharif-2020

Sixteen (16) entries of Sorghum were planted on 18.07.2020 to evaluate the promising lines/varieties for grain yield. The layout was done according to Randomized Complete Block Design with three replications in a plot size 5m x1.5m. Plant to plant and row to row distances were kept 15cm and 75cm respectively. Standard agronomic and plant protection measures were carried

out in the experiment. The harvesting was done on 08.12.2012. The data recorded for different morphological traits are presented in table below

Table. 102 Results of National Uniform Sorghum (Grain) Yield Trial at D. G. Khan

S #	Entry Name	Crop Stand	Grain Yield (Kg/ha)	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50% anthesis
1	YSH-134	45	4000a	40444	237	83
2	YSS-42	44	3778a	47222	245	87
3	YS-16 (c)	46	3156b	31667	287	89
4	Nagina	46	3067bc	36667	250	82
5	Sweet Betty	47	2800cd	47111	309	92
6	Omega	45	2667de	28667	258	86
7	YSH-132	45	2667de	24667	197	80
8	14SB7001	47	2667de	38889	299	76
9	Eagle	46	2400ef	31111	236	83
10	Fakhr-e-Punjab	46	2178fg	25333	234	84
11	Sweet AS	47	2000g	54222	301	96
12	16GS2670	46	1511h	15889	141	72
13	R-3636	46	1333h	21333	157	76
14	W-3535	47	1200h	13555	137	84
15	Q.S-499	46	711i	25111	284	67
16	YSS-10	0	0j	0	0	0
	CV %	1.43	8.69	3.97	2.63	1.51
	LSD 5%	N.S	327.11	1986.4	9.805	1.95

The results revealed that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 4000 kg/ha was recorded for YSH-134. While minimum grain yield of 711 kg/ha was recorded for Q.S 499. Highest stalk yield was recorded for Sweet AS i.e., 54222kg/ha while minimum stalk yield was recorded for W-3535 i.e. 13555 kg/ha. Maximum plant height of 309 cm was observed for Sweet Betty while minimum plant height of 137 cm was observed for W-3535. Sweet AS took maximum 96 days to 50% anthesis while Q.S-499 took minimum 67 days.

4. Sorghum Gene Pool

Eighty four (84) sorghum cultivars/lines comprising of local and exotic origin were sown on 25.07.2020 in strips having plot size 5m x 1.5m. All entries were maintained by open pollination and guarded plants of each cultivar were harvested on 23.12.2020 and threshed carefully that will be sown for maintenance during KH-2021

PEARL MILLET

1- Pearl Millet Varietal Yield Trial, Kharif-2020

Twelve lines/varieties of Pearl Millet were planted on 26.07.2020 to evaluate the promising lines/varieties for grain yield. The layout was done according to Randomized Complete Block Design with three replications in a plot size 5m x 1.5m. Plant to plant and row to row distances was kept 15cm and 75cm respectively. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 25.11.2020. The data recorded for different morphological traits are presented in table below.

Table. 103 Results of Pearl Millet Varietal Yield Trial at D.G.Khan

S #	Entry Name	Crop Stand	Grain Yield (kg/ha)	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50% anthesis
1	YBH-278	31	2933a	8666	176	66
2	86-M-88	31	2267b	7778	176	70
3	YBS-94	29	2000c	7667	222	73
4	YBS-70	31	1911cd	8333	263	69
5	YBS-98c	29	1867cd	7444	221	70
6	YBS-83	31	1778de	10000	227	68
7	YBS-92	29	1689ef	7667	221	69
8	YBS-93	30	1689ef	8111	222	70
9	YBS-89	30	1644efg	10000	235	71
10	YBS-95	30	1600fg	9000	225	69
11	18-BY	30	1511g	10667	291	72
12	YBR-5	30	1244h	7000	231	61
	CV%	2.36	5.66	3.52	3.14	1.43
	LSD 5%	NS	176.74	508.15	12.02	1.65

The results revealed that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 2933 kg/ha was recorded for YBH-278 while minimum grain yield of 1244 kg/ha was recorded for YBR-5. Highest stalk yield of 10667 kg/ha was recorded for 18-BY.while minimum stalk yield of 7000 kg/ha was recorded for YBR-5. Maximum plant height of 291 cm was observed for 18-BY while minimum plant height of176cm was observed for 86-M-88 and YBH-278. YBR-5 took minimum 61 days to 50% anthesis as compared to YBS-94 which took maximum 73 days.

2. National Uniform Millet (Grain) Yield Trial, Kharif-2020

Thirty one lines/varieties of pearl millet were planted on 26-07-2020 to evaluate the promising lines/varieties for grain yield. The layout was done according to Randomized Complete Block Design with three replications in a plot size 5m x 1.5m. Plant to plant and row to row distance was kept 15cm and 75cm respectively. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 26.11.2020. The data recorded for different morphological traits are presented in table below.

Table. 104 Results of National Uniform Millet (Grain) Yield Trial at D.G.Khan

S #	Entry Name	Crop Stand	Grain Yield (Kg/ha)	Stalk Yield (kg/ha)	Plant Height (cm)	Days to 50% anthesis
1	HERCULES	36	2978a	8667	208	67
2	Q.S-299	36	2711b	9000	134	72
3	PM-61	35	2622bc	8445	130	72
4	14RBS-05	35	2578c	11333	159	65
5	G127E-28	35	2356d	7444	131	66
6	LG-98	36	2311de	12222	191	64
7	16RBS-15	34	2311de	7667	178	67
8	SD-55S95	35	2222ef	7667	168	72
9	Rustum-King	35	2222ef	7333	168	69

10	MUGHAL-E-AZAM	35	2178f	6333	132	69
11	86M20	37	2178f	8333	139	70
12	YBH-278	36	2133f	8778	140	66
13	Global	36	1911g	9000	143	67
14	SD-55S20	35	1867gh	9444	154	71
15	PM-65	36	1867ghi	9333	165	68
16	LG-98	36	1822ghi	8000	192	70
17	16RBS-10	35	1822ghi	7444	128	63
18	SHAHENSHAH	36	1778hi	10778	137	68
19	HP-233	36	1778hi	11000	151	68
20	86M38	36	1778hi	7667	143	70
21	ML-72	34	1778hi	6333	179	66
22	DS-1122	36	1778hi	7556	139	73
23	SHAHANSHA	35	1733ij	9111	142	72
24	RS-MASTER	35	1733ij	8000	178	69
25	N-95	35	1644jk	8333	141	70
26	SD-55S90	36	1644jk	9667	155	72
27	Fareed-01	36	1600k	7000	124	68
28	AAS-7868	36	1556k	7000	134	73
29	HS long jump	36	1422L	7000	139	73
30	JUMBO	0	0M	0	0	0
31	Fighter-72	0	0M	0	0	0
	CV%	2.42	3.87	4.36	3.14	1.32
	LSD 5%	N.S	118.91	564.64	7.31	1.39

The results revealed that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 2978 kg/ha was recorded for line/variety HERCULES while minimum grain yield of 1422kg/ha was recorded for HS long Jump. Highest stalk yield was recorded for LG-98 i.e., 12222 kg/ha while minimum stalk yield was recorded for MUGHAL-E-AZAM and ML-72 i.e., 6333kg/ha. Maximum plant height of 208 cm was observed for HERCULES while minimum plant height of 124cm was observed for Fareed-01. Entry AAS-7868, HS long jump and DS-1122 took maximum 73 days to 50% anthesis while 16RBS-10 took minimum 63days.

3. On-Farm Pearl Millet Yield Trial, Kharif-2020

Two advance lines and a standard variety YBS-98of pearl millet were tested at three different locations in D.G.Khan division to evaluate the performance/adaptability of the material on farmer`s field in a plot size of one kanal for each variety. Plant to plant and row to row distances were kept 20 cm and 75cm respectively. The data recorded for grain yield is presented in table below.

Table. 105 Results of On-Farm Pearl Millet Yield Trial at D.G.Khan

S.No.	Address of location		
		YBH-278	**YBS-98**
1	Muhammad Rafiq R/O Mauza Mangrotha Gharbi, Taunsa, D.G.Khan.	1877	1640
2	Mr. Atta Ullah R/O Mouza Mohammad Hora,Jampur,D.G.Khan	1798	1561
3	Muhammad Qasim Qureshi R/o Chak Salaari D.G.Khan	1719	1462

Average	**1798**	**1554**

This table revealed that the VarietyYBH-278 gave maximum grain yield on an average i.e. 1798 kg/ha as compared to rest of the varieties of the trial at three different locations in D.G. Khan Division.

ADMINISTRATION
STAFF POSITION

Sr. No.	Designation of the Post.	Staff in Position	Number of Vacant Post	Total Sanctioned Strength
1	Director	-	01	01
2	Maize Botanist	-	01	01
3	Sorghum Botanist	01	01	01
4	Associate Maize Botanist	01	01	01
5	Associate Millet Botanist	01	01	01
6	Agronomist	01	-	01
7	Assistant Botanist Maize	07	-	07
8	Assistant Botanist Millet	01	-	01
9	Assistant Botanist Sorghum	-	01	01
10	Assistant Agronomist	02	-	02
11	Assistant Entomologist	01	01	02
12	Assistant Agricultural. Chemist	01	01	01
13	Assistant Statistician	-	01	01
14	Assistant Research Officer	17	03	20
15	Superintendent	01	-	01
16	Field Assistant	16	11	27
17	Plant Observer	10	03	13
18	Ministerial Staff	12	03	15
19	Laboratory Assistant	02	01	03
20	Computer Operator	01	-	01
21	Stenographer	01	01	02
22	Foreman	01	-	01
23	Mechanic	01	-	01
24	Driver	04	01	05
25	Electrician	01	-	01
26	Naib Qasid	06	01	07
27	Tube well Operator	05	01	06
28	Beldar	41	05	46
29	Chowkidar	05	01	06
30	Mali	-	01	01
31	Sweeper	01	-	01
32	Cook	01	-	01
Total		**142**	**41**	**179**

LIST OF RESEARCH STAFF

Sr. No.	Name of Officer	Designation	Qualification
1	Mr. Asrar Mehboob	Agronomist	M. Sc. (Hons) Agri.
2	Mr. Muhammad Saeed	Assistant Botanist Maize	M. Sc. (Hons) Agri.
3	Rana Abdul Hamid Khan	Assistant Botanist Maize	M. Sc. (Hons) Agri.
4	Mr. Aamir Hussain	Assistant Botanist Maize	M. Sc. (Hons) Agri.
5	Mr. Ahsan Raza Mahli	Assistant Botanist Maize	M. Sc. (Hons) Agri.
6	Mr. Amjad Khan Tareen	Assistant Entomologist	M. Sc. (Hons) Agri.
7	Mr. Khadim Hussain	Assistant Botanist Maize	M. Sc. (Hons) Agri.
8	Mr. Saleem-ur-Rehman	Assistant Botanist Maize	M. Sc. (Hons) Agri.
9	Dr. Javed Iqbal	Assistant Agronomist	Ph.D.
10	Mr. Muhammad Siddique	Assistant Botanist Millet	M. Sc. (Hons) Agri.
11	Mr. Abdul Razaq	Assistant Botanist Maize	M. Sc. (Hons) Agri.
12	Miss. Khansa Khakwani	Assistant Research Officer	M. Sc. (Hons) Agri.
13	Mr. Ghulam Murtaza	Assistant Research Officer	M. Sc. (Hons) Agri.
14	Dr. Muhammad Shoaib	Assistant Research Officer	Ph.D.
15	Mr. Shahid Hussain	Assistant Research Officer	M. Sc. (Hons) Agri.
16	Mr. Aamir Ghani	Assistant Research Officer	M. Sc. (Hons) Agri.
17	Mr. Muhammad Shakeel	Assistant Research Officer	M. Sc. (Hons) Agri.
18	Miss. Saeeda Khanum	Assistant Research Officer	M. Sc. (Hons) Agri.
19	Muhammad Husnain Bhatti	Assistant Research Officer	M. Sc. (Hons) Agri.
20	Mr. Barkat Ali	Assistant Research Officer	M. Sc. (Hons) Agri.
21	Mr. Naveed Kamal	Assistant Research Officer	M. Sc. (Hons)Agri.
22	Dr. Waseem Akbar	Assistant Research Officer	Ph.D.
23	Mr. Hafiz Mutahir Javed	Assistant Research Officer	M. Sc. (Hons)Agri.
24	Mrs. Iqra Ibrar	Assistant Research Officer	M. Sc. (Hons)Agri.
25	Mr. Aamar Shehzad	Assistant Research Officer	M. Sc. (Hons)Agri.

STATIONS AND SUB-STATIONS

Sr. No.	Name of Sub-Station	Total area (acres)	Remarks
1.	**Maize & Millets Research Institute, Yusafwala-Sahiwal (Headquarter)**	1671.0	Research and Maize Seed Production Farm.
2.	**Maize Sub-Station, Chak 86/9-L, Sahiwal.**	459.625	Research and Maize Seed Production Farm.
3.	**Maize Seed Farm, Chak 1 1/14-L, Iqbal nagar District Sahiwal.**	929.00	Research and Maize Seed Production Farm.
4.	**Maize Research Station, Ayub Agricultural Research Institute, Faisalabad.**	10.81	Research work on maize.
5.	**Millets Research Station, Rawalpindi.**	2.0	Research work on millets.
6.	**Sorghum Research Sub-Station, Dera Ghazi Khan.**	0.663	Research work on sorghum (Yield Trials).
7.	**Maize Breeding Sub-Station, Chharrapani, Murree**	0.781	Development work on maize.

FINANCIAL STATEMENT

Year	Allocation (Rs.)	Expenditure (Rs.)	Target (Rs.)	Income (Rs.)
2009-2010	33,321,000	32,674,726	3,220,000	2,772,758
2010-2011	45,117,000	44,657,876	4,250,000	2,591,967
2011-2012	53,819,000	52,830,336	2,700,000	2,968,174
2012-2013	64,957,300	65,194,794	2,900,000	5,085,828
2013-2014	72,818,600	70,717,588	6,180,000	5,490,731
2014-2015	71,407,800	69,997,676	6,688,000	7,589,931
2015-2016	78,050,000	77,147,941	5,680,000	8,997,133
2016-2017	93,880,600	92,589,983	10,643,400	11,127,299
2017-2018	96,159,924	95,303,116	10,200,000	11,299,240
2018-2019	98,207,335	97,773,690	12,48,5000	12,006,126
2019-2020	103,477,044	102,102,405	11,963,500	12,008,182
2020-2021	115152813	114218485	11955425	16574454

Following heads are being operated.
Under Grant No PC-21018-Agriculture-50000 Economic Services
51000 Agriculture & Food
51300 Agriculture Services Extension Services Non-Development

ADVISORY SERVICES (FARMERS & OTHERS):

1. One (1) TV talk, Thirty five (35) radio talks were delivered to farmers about the maize, sorghum and pearl millet crops.
2. One farmer day was conducted on 28.11.2019for guidance of farmers regarding production technology of maize crop to get higher yield.
3. Capacity building of local seed companies regarding hybrid seed production technology of Maize & Millets crops under agricultural innovation program (AIP) was conducted on June 30, 2021 in the seminar room of MMRI, Yusafwala- Sahiwal
4. A meeting regarding maize in the scenario of Covid-19 was held in the conference room of MMRI, Yusafwala-Sahiwal under the chairmanship of DG Agri-Ext on April 30, 2020.
5. A training regarding "Profitable maize production technology in changing scenario under CIMMYT-LED heat tolerance maize for Asia (HTMA) Project" was conducted on June 24, 2020 in the seminar room of MMRI, Yusafwala- Sahiwal.

PROBLEMS AND BOTTLENECKS

Dead lock and litigation with Pattadars is a major problem and affecting the efficiency of research workers.

At present, land (0.663 acre) of Sorghum Research Substation, D.G. Khan (production zone of Sorghum and Bajra) is quite insufficient. More land should be provided for research and seed production.

Boundary wall around the research area is needed for protection of research material from nearby animals of Ex- Pattadars / illegal occupants.

Experimental area at Millets Research Station Rawalpindi (2.0 acre) is very less to meet the requirements of mandatory research work on respective crop.

MAIZE AND MILLETS RESEARCH INSTITUTE, SAHIWAL

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OVERVIEW

The main objective of Maize and Millets Research Institute, Yusafwala-Sahiwal is to develop new varieties/hybrids of maize and millets crops and their pre-basic and basic seed production. This institute has two zonal research stations, Maize Research Station, Faisalabad working on maize hybrids development program since 1990 and Millets Research Station Rawalpindi established in 1976 to enhance the production of Pearl millet and maize crops through high yielding varieties and modern crop production technology in rain fed areas of Punjab. Maize crop has a significant role in Pakistan's economy due to its diversified uses as feed for poultry industry, food for human being and fodder for livestock. In Punjab due to adoption of hybrids per hectare yield of maize has been increased from 1890 kg/ha (2001-02) to 5970kg/ha (2020-21). This institute has released 16 OPV's, 16 hybrids of maize, three varieties and one hybrid of sorghum, and two varieties of pearl millets so far. During this year, two maize hybrids (YH-5482, YH-5568 & YH- 5569) have been approved by the Punjab Seed Council while one maize hybrid YH-5561, one Sorghum hybrid YSH-132 and one Pearl Millet hybrid YBH-278 of this institute were recommended by expert sub-committee on 12/07/2021 for approval in Punjab Seed Council. Moreover one (01) maize hybrid, one pearl millet hybrid, two sorghum hybrids and one sorghum OPV are being tested under DUS studies. These newly approved high yielding hybrids and OPV's will be helpful in self-sufficiency. The research work conducted in 2020-21and salient achievements is as under:

HYBRID MAIZE (*Zea mays* L.)

Maintenance and Derivation of Yellow Maize Inbred Lines

Three hundred and fourteen (314) and eight hundred (800) inbred lines were maintained at Maize & Millets Research Institute, Yusafwala in Kharif 2020 and spring 2021 respectively by hand pollination. All these lines were maintained by self-pollination and harvested for next cycle of maintenance and purification considering their true to type behavior and other desirable traits. Data of desirable parameters were recorded for all the lines separately.

Three hundred & forty two (342) and 311derivative families in Kharif 2020 and spring 2021 respectively was sown ear to row for inbreeding through hand pollination. Plants selected on the basis of desirable traits like erect to semi erect leaves, medium to heavy tassel, cob length, low cob placement, strong root anchor, disease and heat tolerance were self-pollinated in all the families.

At Maize Research Station, Faisalabad one hundred and eighty (180) inbred lines were maintained and two hundred and twenty two (222) inbred families' generations were advanced in Kharif-2020.

Maintenance and Derivation of White Maize Inbred Lines

For maintenance and derivation of inbred lines through hand pollination 61 inbred lines in Kharif 2020 and 67 inbred lines in spring 2021 were maintained. One hundred & sixty (160) and 118 derivative families of different generations were sown in ear to row fashion during Kharif-2020 and Spring 2021.Selfed plants were harvested at maturity and in Kharif 2021, seed of sixty seven (67) inbred lines were finally selected and maintained with inclusion of 6 new inbred lines with inclusion of 118 families for further derivation and selection cycles. In spring 2021, 118 derivative families were added.

Hybrid Constitution

At MMRI, Yusafwala, one hundred & thirty four (134) single cross hybrids of yellow with five males and twenty nine (29) of white maize were constituted in isolation blocks in Kharif 2020 while one hundred & ninety five (195) of yellow with four males and 50 single cross hybrids of white maize in Spring 2021 with three males in isolated blocks were constituted through detasseling of female lines.

At MRS, Faisalabad Seventy nine(79) new single cross hybrids were constituted in two isolations and by hand pollination during Kharif-2020.

Hybrid Evaluation

Preliminary Yield Trials

Objective was to select high yielding newly constituted hybrids. At MMRI, Yusafwala One hundred and seventy (170) single cross entries were evaluated in five preliminary yield trials of yellow while Forty eight (48) single cross hybrids of white maize were evaluated in three preliminary yield trials along with different commercial checks at MMRI. Local hybrid YH-5898(Fig.1) gave maximum grain yield i.e.14992kg/ha followed by local hybrid YH-5867 by giving 14874 kg/ha in comparison to checks during Kharif 2020.

Fig 1: YH-5898 a promising high yielding hybrid selected at MMRI

In spring 2021, 101 single cross entries were evaluated in four preliminary yield trials along with different commercial checks. Local hybrid YH-5967 gave maximum grain yield ie.11071kg /ha followed by commercial hybrid P1429 ie.10682 kg/h during spring 2020.

One hundred and forty (140) single cross hybrids were evaluated in five trials during Kharif-2020 at MRS, Faisalabad. Local hybrids FH-1950, FH-1928, FH-1912, and FH-1936 with grain yield of 12069, 11740, 11383and 11052 kg/ha respectively excelled in yield over check hybrids FH-1046 (9629kg/ha) and YH-5427 (8567kg/ha) in local yield trials. One best performing hybrid FH-1950 is shown below in Fig.2

Fig 2: Elite Candidate maize hybrid FH-1950selected from preliminary yield trials.

During spring 2021 four trials of 30 hybrids each including three checks was tested at Faisalabad. Local hybrids FH-2019, FH-2047, FH-2070 and FH-1429 with grain yield of 13250, 12685, 12746 and 12102kg/ha respectively gave higher yield than check hybrids FH-1046 (8362 kg/ha), YH-1898 (8215 kg/ha) and YH-5427 (7709 kg/ha) at

MRS. One best performing hybrid FH-2047 is shown below in Fig.3

Fig 3: FH-2047 hybrid selected after evaluation in preliminary yield trial spring2021 at MRS

Micro Yield Trials

At MRS, Faisalabad, thirty (30) single cross hybrids were evaluated in two trials consisting of 16 and 14 hybrids each during Kharif 2020. Local hybrids FH-1400 and FH-1720-2 with grain yield 8298 and 6661kg/ha respectively, were found higher yielder as compared to checks DK-6724(5789 kg/ha) and FH-1046 (3927kg/ha).

Fig 4: High yielding elite maize hybrid (FH-1400) selected after evaluation in micro yield trial Kharif2020 at MRS

In spring 2021 thirty eight (38) single cross hybrids were evaluated in two trials consisting of 18 and 20 hybrids each in micro yield trial. Local hybrids FH-1881and FH-1953 shown in Fig.5, 7 with grain yield 11082 kg/ha and 10072 kg/ha respectively, gave higher yielder as compared to checks P-1429 (9694 kg/ha), FH-1046 (8458kg/ha), DK-6724 (8503 kg/ha) and YH-5427 (8043 kg/ha).

Fig 5: High yielding elite maize hybrid FH-1953 selected after evaluation in preliminary yield trial spring 2021

Macro Yield Trials

At MRS, Faisalabad sixteen (16) single cross hybrids were evaluated in two trials during Kharif 2020. FH-1731 (Fig.6) and FH-1400 with respective grain yields 8154 and 8148kg/ha were found better yielder than check YH-5427 (6757kg/ha) on average basis.

Fig 6: High yielding promising maize hybrid (FH-1731) selected after evaluation in macro yield trial Kharif2020 at MRS

During spring 2021, thirty two (32) single cross hybrids were evaluated in two trials. FH-1616 and FH-1881 (Fig. 7) with grain yields 9834kg/ha and 9688 kg/ha was found better yielder than checks YH-5427 (9201kg/ha) and FH-1046 (8292kg/ha) on average basis.

Fig 7: High yielding promising maize hybrid (FH-1881) selected after evaluation in macro yield trial Spring 2021 at MRS

National Uniform Maize Hybrid Yield Trial

To evaluate different national and multinational maize hybrids for adaptability in different agro-climatic zones across the country, two trial set A & B consisting of129& 64 hybrids in Kharif, 2020 & spring 2021 were received from the National Co-coordinator PARC, Islamabad was laid out at MMRI. The results revealed that Hybrid T-9211exhibited the highest grain yield of 12502 followed by Hybrid S-1682 (11969 kg/ha) during kharif-2020 while at MRS. Fsd two NUYT trial set A & B consisting of 117 & 111maize hybrids

in Kharif, 2020 was laid out at MRS, Faisalabad. The results revealed that Hybrid OGS-0361exhibited the highest grain yield of 8948 kg/ha followed by AS-376 (8741 kg/ha) and local check (5325kg/ha) in set A and in set B HybridFM-141 exhibited the highest grain yield of 7619kg/ha in comparison to check YH-1898 (4855kg/ha).

Whereas two trials set A & B consisting of 129 and 63 hybrids respectively received from the National Co-coordinator PARC, Islamabad was laid out at MRS, Faisalabad in spring 2021. The results revealed that at MRS Hybrid entry 65 exhibited the highest grain yield of 12422 kg/ha and in set B Entry12 exhibited the highest grain yield of 10094 kg/ha.

PARB PROJECTS

Acceleration of Maize Breeding through Inducer Lines Mediated Doubled Haploids (PARB No. 900)

In Kharif 2020, 40 double haploids lines were sown at MMRI under normal and stress conditions (drought and heat) and were selfed. Thirty double haploids were selected on the basis of different parameters. In spring 2021, 30 DH Lines were sown with four testers for constitution of hybrids. 70 hybrids were recovered with sufficient seed. At MRS, Faisalabad during Kharif2020, Twenty (20) DH lines were sown for evaluation and data recording. Ten (10) were selected for constituting single cross DH hybrids. In spring 2021, twenty DH lines were successfully maintained.

Fig 08: Colchicine Treatment to Haploids Seedlings in laboratory of MMRI

Nutrition enhancement of crops, fruits, vegetables and their products under climate change scenario (PARB No. 904)

Inbred lines of selected hybrids (25 single cross combinations in isolation) were sown at MMRI during Kharif 2020. Harvesting of selected hybrids (25 single cross isolations) was completed.500 -1000 g seed of each hybrid (isolation) was dried, shelled and stored. During spring 2021, Multi-locational trials were sown at 20 locations in Punjab during month of February, 2021. Yield and quality data was analyzed and five (5) hybrids were selected by viewing both of criteria for further reconstitution. At MRS, Faisalabad Twenty (20) inbred lines were maintained and crosses were made to constitute single cross hybrids by hand pollination. 20 successful F1 Crosses were harvested in Kharif 2020. During spring 2021 one hundred and forty-seven (147) single cross hybrids were sown in multi-location replicated trials for evaluation regarding yield and quality. The seed of these hybrids was sent to biochemistry lab, Faisalabad for analysis of protein, fat, fiber and ash contents. MNH-84 was found to be best quality hybrid. MNH-89 & MNH-142 also showed promising results. Parental lines of testing 20 hybrids were maintained successfully during spring 2021.

MAIZE OPVs

Pool-50 & Pool-60

Seed of selected half-sib families was sown in isolation to maximum genetic recombination and finally 85 cobs were selected for evaluation in both seasons Kharif 2020 and Spring 2021.

SORGHUM (*Sorghum bicolor* L.)

Germplasm Maintenance and Hybrids Constitution

Eighty-one (81) local entries were planted at Yusafwala and 84 entries were planted at D.G. Khan. Five (5) plants in each entry were maintained by covering the panicles. Thirty eight (38) CMS (A) lines with their counterpart (B) lines and 30 local fertility restorer (R) lines were planted at Yusafwala. Twenty six (26) (CMS x R) crosses were constituted (22 in two isolations and 4 by hand). Thirty one (31) filial F-families (10 F2, 17 F3, 1 F5& 3 F6) were planted and phenotypically superior plants were selected and harvested for raising their next filial generation. 11 mutated entries of sorghum were planted and 7 heads were selected for next sowing.

Evaluation of Hybrids and OPVs

Seventeen (17) (CMS x R) hybrids were tested with two checks (Fakhar e Punjab &

YS-16) at MMRI, Yusafwala and SRSS, D. G. Khan. The results revealed that YSH-132 gave maximum yields (8066.67 kg/ha. Maximum stalk yield of 61667 kg/ha was produced by YSH-212 at MMRI, while at SRSS, D.G. khan, YSH-131 gave maximum yield of 8067 kg/ha. Graphical representation of the trial at MMRI is given below in Fig 09.

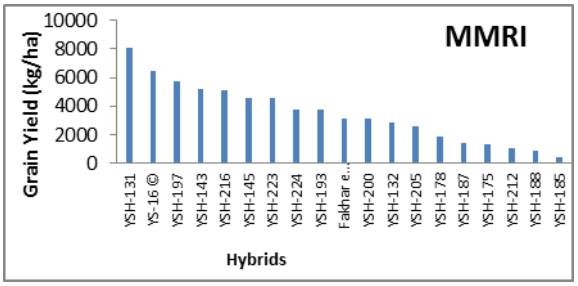

Fig 09. Yield performance of nineteen (19) sorghum representative hybrids placed in a bar chart on X-axis against grain yield at on Y-axis at MMRI.

Fifteen (15) hybrids with one check (Fakhar e Punjab) were tested at MMRI, Yusafwala. The results revealed that that Fakhar e Punjab exceeded all the hybrids and gave significantly higher yields (6508.33 kg/ha) followed by YSH-170 (6213.54 kg/ha) and YSH-153 (6054.49 kg/ha). Graphical representation of the trial at MMRI is given below in Fig 10.

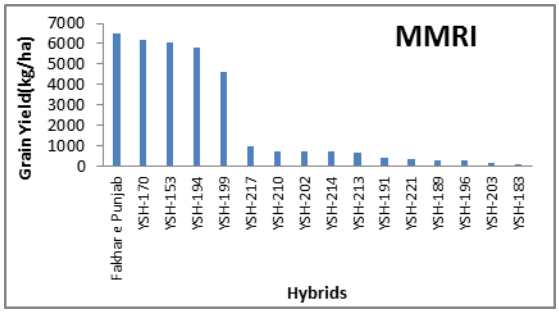

Fig 10. Yield performance of Fifteen (15) sorghum representative hybrids.

Ten (10) varieties were evaluated with one check YS-16 at MMRI, Yusafwala and SRSS, D. G. Khan. YSS-17 gave significantly higher yields (5500 kg/ha) along with YSS-31 (4125 kg/ha) and YSS-18 (4000 kg/ha) at MMRI in comparison to check YS-16, 2125 kg/ha, while at SRSS, D. G. khan, YSS-41 and YSS-18 gave significantly higher yields (2889&2622kg/ha) in comparison to check YS-16 (2222kg/ha). Graphical representation of the trial at MMRI is given below in Fig 11.

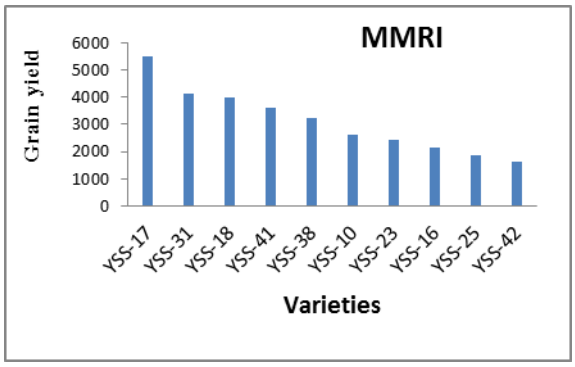

Fig11. Yield performance of ten (10) sorghum varieties placed in a bar chart on X-axis against grain yield on Y-axis in a yield trial at MMRI.

National Uniform Yield Trial

A trial consisting of 12 entries were planted at MMRI, Yusafwala. The results revealed that hybrid YSH-134 gave highest yield (3152 kg/ha) followed by variety YSS-42 (2977 kg/ha) and YSH-132 (2922 kg/ha) in comparison to local check YSH-95 (2858 kg/ha) and commercial check Lasani (2698 kg/ha)

Pearl Millet (*Pennisetum typhoides*)

Maintenance of Germplasm / Derivations / Constitutions

Sixteen germplasm entries, 9 CMS (A) lines with respective counterpart (B) lines, 27 R-lines, were maintained by hand pollination. Thirty one segregating families were sown. Three to four heads in each family were selfed and harvested for planting during next generation. Twenty four crosses were made, panicle were harvested and threshed, seed of this new combination was stored for next season sowing and evaluation.

Yield Evaluation

Pearl Millet Varietal Yield Trial

The trial was comprised of twelve (12) varieties including two check varieties (YBS-98) and (86M88) sown in RCBD fashion. Data were recorded for grain yield and various other agronomic traits. YBH-278 produced maximum grain yield followed by 86M88 (Check) with grain yield of 5718 and 4592 kg/ha respectively. Whereas line YBR-05 remained at the bottom with grain yield of 2554kg/ha.

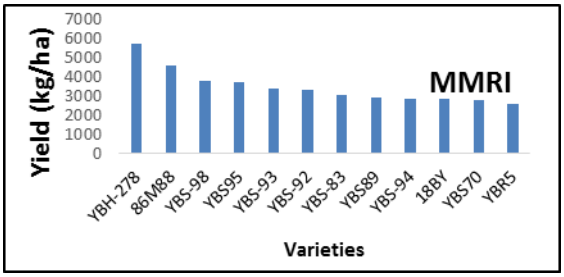

Fig 12. Yield performance of Twelve (12) pearl millet varieties with two check varieties.

Pear Millet Hybrid Yield Trials

In pearl millet micro hybrid trial, twenty-Four hybrids were evaluated for yield at Yusafwala. The result showed that YBH-278 ranked first by producing grain yield of 5925kg/ha followed by 86M88 (5078kg/ha) at Yusafwala.

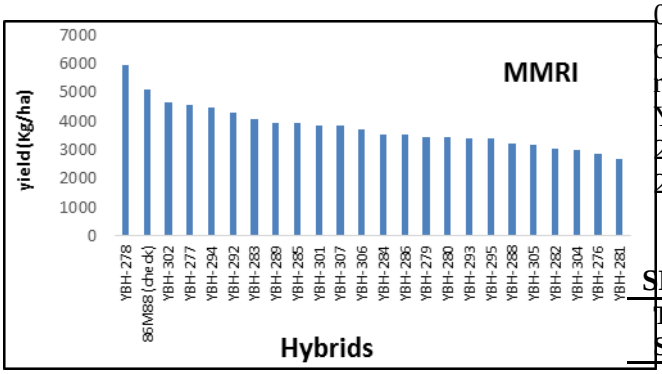

Fig 14. Yield performance of twenty four (24) pearl millet hybrids were placed in a bar chart on X-axis against grain yield on Y-axis in a yield trial at MMRI in Kharif 2020.

Fourteen promising lines developed at Millets Research Station, Rawalpindi along with two checks (hybrid/variety) were evaluated. The hybrid YBH-278 gave maximum yield (3253kg/ha) followed by 19RBS-56 (3125kg/ha). While genotype 19RBS-63 gave minimum yield of 1064 kg/ha. The graphical representation of the trial at MRS Rawalpindi is given below in Fig 15.

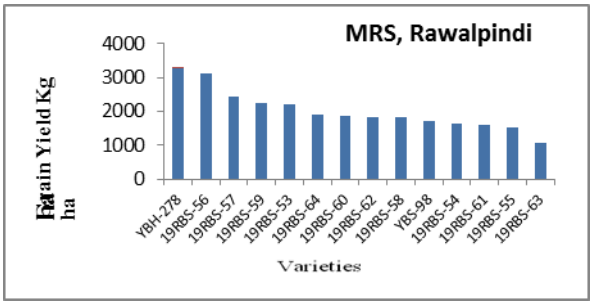

Fig 15. Yield performance of fourteen (14) pearl millet varieties.

Adaptability/National Uniform Pearl Millet Grain Yield Trial

The trial comprising of Thirty-one (31) entries was received from the National Coordinator of MSM, NARC, and Islamabad, According to the results received from the National Coordinator, 16RBS-15 surpassed the check variety by giving 7.31% more mean yield followed by 14 RBS-05 which gave 2.53% more yield.

OPV Seed Production

During Kharif 2020, YSB-98 and 18-BY were sown on an area of 7 kanals & 0.5kanals, and 800kg and 100 kg seed was obtained for mentioned varieties, respectively. YBS-95, YBS-94, YBS-70 and YBS-83 were grown on an area of 150, 120, 200 and 150 m2 with a production of 90, 53, 27 and 70 kg seed, respectively.

SEED PRODUCTION

Table 1: Seed Production of Maize, Sorghum and Pearl Millet Crop 2020-21

	BNS	Pre-Basic	Total kg
Maize Hybrid	-	-	6392
Maize OPV	36.75	14070	14107
Maize Inbred Lines	-	-	1597
Sorghum	43	1814	1857
Pearl Millet	50	1172	1222

Table 1. Total seed produced at MMRI is divided into three categories based on its production procedure.

(i) AGRONOMIC STUDIES

Determination of optimum plant population for hybrid maize (YH-5427) in bed sowing in spring season

This experiment was conducted with five planting density viz. 35000, 38000, 41000, 44000 and 47000 plants acre-1. Results revealed that maximum fresh ear weight and grain yield was obtained from 44000 plants acre-1 that were statistically not different from that obtained from 41000 and 38000 plants acre-1. While minimum fresh ear yield and grain yield was obtained from 35000 and

47000 plants acre-1.The graphical representation of the trial at MMRI is given below in Fig 16.

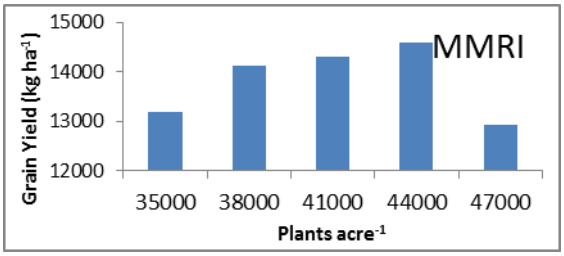

Fig 16. Determination of optimum plant population for hybrid maize (YH-5427) in bed sowing in spring season.

Determination of optimum plant spacing of hybrid maize (FH-1210) on ridge sowing

The objective was to find out the suitable plant spacing under ridge-furrow sowing for maize hybrid FH-1210 in spring season. Five plant spacing were evaluated viz. 12.5, 15, 17.5, 20 and 22.5 cm. Results suggest that highest grain yield was obtained from 7 inch plant spacing that was statistically not different from 5 and 6 inch spacing. Lowest grain yield was recorded at 9 inch plant spacing. The graphical representation of the trial at MMRI is given below in Fig 17.

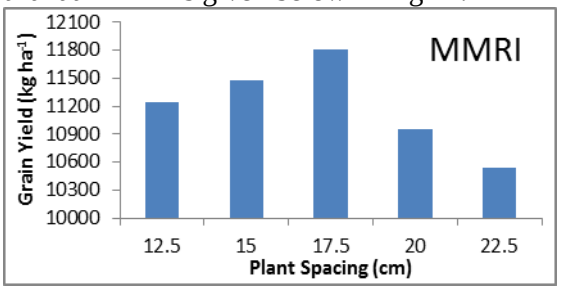

Fig 17. Determination of optimum plant spacing of hybrid maize (FH-1210) on ridge sowing. Five plant spacing of FH-1210 placed in a bar chart on X-axis against grain yield on Y-axis at MMRI in Spring-2021

Compensation of poor germination and plant losses in maize through transplantation

This study is being conducted with an objective to explore the option of transplanted maize in maintaining the required plant population in case of scanty plant stands. Treatments consist of four age of nursery at the time of transplanting viz: 1) control (No transplanting), 2) Gap filling by transplantation (Germination trays established 3 days prior to field sowing 3) Gap filling by transplantation (Germination trays established 2 days prior to field sowing 4) Gap filling by transplantation (Germination trays established 1 days prior to field sowing 5) Gap filling by transplantation (Germination trays established on the day of field sowing). 10% of the plant population was transplanted in each plot. Results revealed that all treatments involving transplanting gave higher grain yield as compared to control but this increase was non-significant. The graphical representation of the trial at MMRI is given below in Fig 18

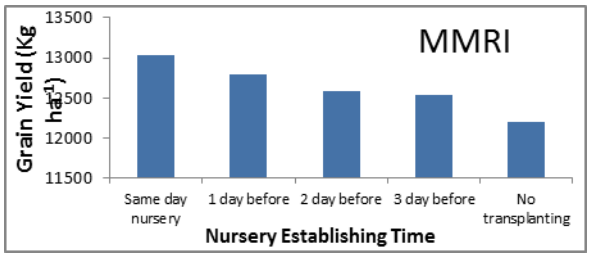

Fig 18. Compensation of poor germination and plant losses in maize through transplantation.

Mix sowing evaluation of maize hybrids in spring season

The objective of the study was to utilize genetic diversity leading to enhanced crop production. Treatments consist of 1) sole crop of YH-5568 2) Sole crop of YH-5427 3) Blended seed sowing of YH-5568 and YH-5427 4) alternative rows of YH-5568 and YH-5427 5) Two row strip cropping of YH-5568 and YH-5427. Sowing was done on 1.05 m wide beds. Results of this experiment are being compiled and analyzed statistically. Similarly maximum grain yield was recorded from two row strip mix sowing however it was statistically not different from sole crop of YH-5568. All other treatments produced similar but lower grain yield.

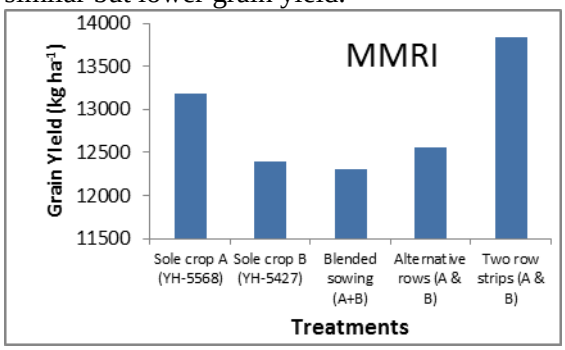

Fig 19. Mix sowing evaluation of maize hybrids in spring season.

Determination of silage production potential of different hybrids and OPVS in different cropping systems of Punjab

The results revealed that maximum biomass was produced by hybrid YH-1898 (75.0 t ha-1) followed by YH-5427(69.5 t ha-1), Sahiwal-Gold (66.88 t ha-1) and Gohar-19 (65.7 t ha-1). Maximum tonnage of biomass was produced at MMRI-Yusafwala across all locations followed by

RRI, KSK. Lowest biomass was produced by Gohar-19 at all locations except at FRI, Sargodha where SWL-Gold produced lowest biomass. Maximum grain filling percentage of ears were in hybrid YH-5427 (82.5) followed by hybrid YH-1898 (62.5%), Sahiwal-Gold (26.3%) and Gohar-19 (16.3%). The graphical representation of the trial at MMRI is given below in Fig 20.

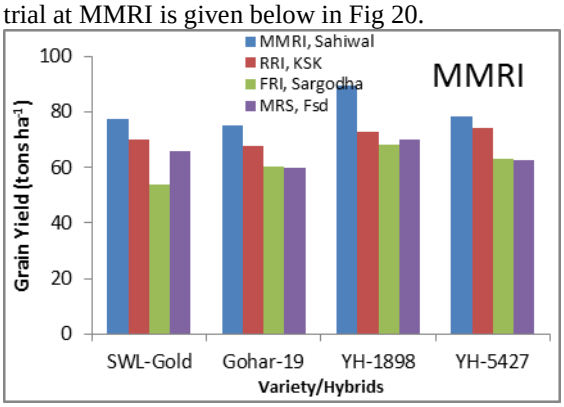

Fig 20: Determination of silage production potential of different hybrids and OPVS in different cropping systems of Punjab

Evaluation of different weedicides for weed control in sorghum

During Kharif 2020 various herbicides were evaluated for better weed control in sorghum crop. Treatments were applied in RCBD, replicated thrice. Control plot with no herbicide application was maintained for comparison. Data revealed that maximum grain yield of 2316.11 kg/ha was achieved with the treatment in which pre-emergence application of metolachlor (83%) + pedimethaline (13%) was made @ 300 ml/ac alongwith spray of mesotrione (5%) + atrazine (50%) at post emergence stage @ 250 ml/ac that was followed by post emergence application of mesotrione (5%) + atrazine (50%) @ 300 ml/ac that yielded 2224.24 kg/ha grains. While the lowest grain yield was recorded with the control treatment that gave 1117 kg/ha.

SOIL SCIENCE

Impact of different fertilizer doses on grain yield of maize hybrid (YH-5954)

During Kharif 2020 N: P: K fertilizer was tested to harvest maximum yield of maize hybrid YH-5954. Results revealed that on bed sowing maximum grain yield of 13323 $kgha^{-1}$ was obtained from N: P: K level 300:150:100 $kgha^{-1}$ followed by N: P: K level 325: 162: 100 $kgha^{-1}$ with grain yield 12648 $kgha^{-1}$. Minimum grain yield 4983 $kgha^{-1}$ was recorded with control (no fertilizer applied).

The effect of phosphorus application method on grain yield of maize hybrid (YH-5482)

During spring-2021 experiment was planned to find out the most effective method of phosphorus application to increase grain yield of maize hybrid. The fertilizer doses were N: P: K 272: 114: 125 $kgha^{-1}$. The experiment comprises of five treatments of phosphorus application method, among five, two were involving broad cast method and three fertigation method. The results revealed that maximum grain yield was recorded where 50% phosphorus was applied through fertigation 12 DAS + 50% phosphorus through fertigation at 8th leaf stage (10262 $kgha^{-1}$) followed by treatment where 50% phosphorus was applied through fertigation 12DAS + 50% phosphorus through fertigation at 5th leaf stage (9823 $kgha^{-1}$). Minimum grain yield (8499 $kgha^{-1}$) was obtained where phosphorus was applied through broad cast method before making beds at sowing time. All the treatments involving phosphorus fertigation recorded higher grain yield than control (conventional broad cast method).

Response of maize hybrid (YH-5482) to split application of potassium at different growth stages

During spring-2021 trial was conducted to find out the effect of split application of potassium on grain yield of maize hybrid at different growth stages. The fertilizer doses were N: P: K 272: 114: 125 $kgha^{-1}$. The results revealed that maximum grain yield 10678 $kgha^{-1}$ was recorded where potassium fertilizer was applied in three equal splits viz. at 5th leaf stage, 8th leaf stage and pre-tessling stage followed by grain yield (10123 $kgha^{-1}$) where potassium fertilizer was applied in two equal splits viz. at sowing time and pre-tessling stage. Minimum grain yield 8593 $kgha^{-1}$ was obtained where full dose of potassium fertilizer was applied at sowing time. All the treatments involving split application of potassium recorded higher grain yield than controlled term (100% at sowing time).

ENTOMOLOGY

Testing of Different Sprayable Insecticides against Shootfly and Corn Aphid

Four Sprayable insecticides namely Commando 75SP, Commando plus 97DF, Confidor 20SL and Actara 25WG were tested

against Shootfly and corn aphid. The results revealed that Commando plus 97DF showed the best control expressing the minimum Shootfly infestation %age (0.67%) with grain yield 8163 kg/ha followed by Commando 75SP expressing Shootfly infestation %age (1.04%) with grain yield 7455 kg/ha. No corn aphid attack was observed on the crop.

To Evaluate the Efficacy of Double Dose of Different Insecticides against Helicoverpa Zea by Soil Application

Four insecticides namely Chlorpyrifos 40EC, Bifenthrin 10EC, Bolten 31EC and Radiant 120SC were tested against Helicoverpazea.The results revealed that Chlorpyrifos 40EC showed the best control expressing the minimum Helicoverpazeainfestation %age (12.02%) with grain yield 9311 kg/ha followed by Bolten 31EC expressing the Helicoverpazeainfestation %age (14.55 %) with grain yield 9133 kg/ha.

PLANT PATHOLOGY

Testing of Stalk Rot Intensity in Maize Hybrids by Artificial Inoculation

Ten maize hybrids were tested in order to check stalk rot intensity. The results showed that YH-5849, YH-5632-3, YH-5852, YH-YH-5761-2, YH-5855, YH-5732 and YH-5875 were found moderately resistant against stalk rot of maize while YH-5749, YH-5632-1 and YH-5876 were found moderately susceptible against stalk rot of maize.

Testing of Different Fungicides against Stalk Rot by Treating the Soil at Their Double Doses

Five fungicides namely Topsin-M 70WP, Hombre Excel 37.25FS, Score 250Sc, Emesto 24FS and Nativo 75WG were tested against stalk rot of maize.The results revealed that Topsin-M 70WP showed the best control expressing the minimum stalk rot infection %age (0.59%) with grain yield 8022 kg/ha followed by Hombre excel 37.25FS expressing stalk rot infection %age (1.77%) with grain yield7611 kg/ha.

Screening of Different Maize Germplasm against Stalk Rot (Fusarium Moniliforme)

In demonstration trial, 277 elite inbred line, 31 pre-elite inbred line and 328 families of derivations were screened out against stalk rot. The results revealed that 03 hybrids were found moderately resistant, 10 hybrids were found moderately susceptible, no hybrid was found susceptible and no hybrid was found highly susceptible.

In elite inbred lines, no line was found highly resistant, 01 line was found resistant and 114 lines were found moderately resistant. 137 lines were found moderately susceptible, 20 lines were found susceptible and 05 lines were found highly susceptible.

In pre-elite inbred lines, no line was found highly resistant, no line was found resistant, 14 lines were found moderately resistant, 17 lines were found moderately susceptible, no line was found susceptible and no line was found highly susceptible.

In derivations, no family was found highly resistant, no family was found resistant, 96 families were found moderately resistant, 228 families were found moderately susceptible, 04 families were found susceptible and no family was found highly susceptible.

Advisory Services:

One (1) TV talk, Thirty five (35) radio talks were delivered to farmers about the maize, sorghum and pearl millet crops.

One farmer day was conducted on 28.11.2019for guidanceof farmers regarding production technology of maize crop to get higher yield.

Capacity building of local seed companies regarding hybrid seed production technology of Maize & Millets crops under agricultural innovation program (AIP) was conducted on June 30, 2021 in the seminar room of MMRI, Yusafwala- Sahiwal

A meeting regarding maize in the scenario of Covid-19 was held in the conference room of MMRI, Yusafwala-Sahiwal under the chairmanship of DG Agri-Ext on April 30, 2020.

A training regarding "Profitable maize production technology in changing scenario under CIMMYT-LED heat tolerance maize for Asia (HTMA) Project" was conducted on June 24, 2020 in the seminar room of MMRI, Yusafwala- Sahiwal.

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2. Kamal, N., M. Siddique, S. Khanum and M. Arshad 2020. Combining ability analysis in a 5x5 diallel cross of maize inbred lines.Cross Current Int. J. of Agri. and Vet. Sciences. 2(6):01-04.

3. Kamal, N., S. Khanum, M. Siddique, S. Hussain and M. F. Ahmed 2020. Inheritance studies for grain yield and its attributes in maize through combining ability analysis. Scholar J. of Agriculture and veterinary sciences 7(8):177-179.
4. Khanum. S, M. Siddique, N. Kamal and B. Khanam 2020.Study of Correlation, Heritability and Genetic Advance in Pearl Millet.Cross Current Int. J. of Agri. and Vet. Sciences, 2(6):05-08.
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6. Riaz, M.W., L.Yang, M.I. Yousaf, A. Sami, X. D. Mei, L. Shah, S. Rehman, L. Xue, H. Si and C. Ma. 2021. Effects of heat stress on growth, physiology of plants, yield and grain quality of different spring wheat (*Triticumaestivum* L.) genotypes. Sustainability 13(2972):1-18.
7. Yousaf, M.I., N. Akhtar,K. Hussain, S. Hussain, A. Ghani, A. Mehboob, M. Akram, I. Ibrar, M.S. Ahmad and M. H. Bhatti. 2020. Genetic potential of local hybrids in comparison to multinational hybrids in maize (*Zea Mays* L.) for growth and yield characteristics. J. Environ. Agric., 5(2):489-495.
8. Yousaf, M. I., N. Akhtar, A. Mumtaz, A. Shehzad, M. Arshad, M. Shoaib and A. Mehboob. 2021. Yield stability studies in indigenous and exotic maize hybrids under genotype by environment interaction. Pak. J. Bot., 53(3):1-8.
9. Yousaf, M.I., M.H. Bhatti, A. Ghani, A. Shehzad, A. Hussain, R. Shehzad, M. A. Hafeez, M. Abbas, M. U. Khalid and N. Akhtar. 2021. Variations among maize (*Zea Mays* L.) hybrids in response to heat stress: hybrids selection criteria. Turk J Field Crops. 26(1), 8-17.

URDU ARTICLES IN *ZARAT NAMA*

1. ***Mosmi makai ke liyay khado ka istamaal*(1st August, 2020)**
2. ***Mosmi maki ki katai o ghai aur makai ki paidawar ko mehfooz tareeqay se zakheera karna (*1st and 15thNovember, 2020)**
3. ***Godaamo ma Makai ki storage aur ehteyate* (1st November, 2020)**
4. ***Bharia Makai ki jadi botio ki talfi (1st March, 2021)***
5. ***Makai ki fasal par darja hrarat k asrat* (15th March, 2021)**
6. ***Maki par Fall Lashkari sundi ka hamla aur Chemei insdad* (15th June, 2021)**
7. ***Kenchway Zameeni Engineer*(1st August, 2021)**

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Metrological Data Recording at Maize & Millets Research Institute, Yusafwala during 2020-21