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# ANNUAL PROGRESS REPORT 2016-17


**MAIZE AND MILLETS RESEARCH INSTITUTE, YUSAFWALA, SAHIWAL**
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# 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 $30^{o}$ 41 N, longitude of $73^{o}$ 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 6132 kg/ha (2015-16) in Punjab due to adoption of hybrids. In maize 12 OPV's, 14 hybrids, four varieties of sorghum and two varieties of pearl millet have been released so far. Punjab Seed Council approved Maize hybrids; YH 1898, FH-949 & FH-1046 and Maize OPVs; Malka 2016, Sorghum OPV; YS-16 and Pearl Millet OPV; YBS-98 for general cultivation during the year 2015-16. Presently nine (9) maize hybrids, two maize OPVs and one elite sorghum hybrid are in progress and most of them are inn National Uniform Yield Trials and 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 Pattadar 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
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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 Pattanamas 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 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 2015-16 and 2016-17 is given below. During the year 2015-2017, total 525.30 mm rainfall was received in comparison to previous 2014-2016534.27 mm rainfall. During fiscal year 2015-16, total 318.90mm rainfall was received. While in during fiscal year 2016-17 206.40 mm rainfall was received. Out of which only 219.70 mm rainfall was received in July and August 2016. Sowing of Kharif crop in August 2016 affected badly due to continuous monsoon rains and stagnant water in the fields caused suffocation to the plants due to which plant growth of maize and millets crops was affected. Neither nitrogenous fertilizers could be applied nor weeds could be eradicated which caused significant decrease in grain yield. In Spring-2017 windstorms were received first on 28-05-2017, damaged to the late sown maize crop at seedling stage and second on 10-06-2017.

| **Sr. No.** | **Month** | **Average temperature $^{O}$C** | | | | **Rainfall (mm)** | |
|---|---|---|---|---|---|---|---|
| | | **Maximum** | | **Minimum** | | | |
| | | **(2015-16)** | **(2016-17)** | **(2015-16)** | **(2016-17)** | **(2015-16)** | **(2016-17)** |
| 1 | July | 39.77 | 39.20 | 27.55 | 28.58 | 108.50 | 92.30 |
| 2 | August | 39.56 | 39.09 | 27.95 | 27.09 | 111.20 | 75.00 |
| 3 | September | 40.06 | 37.25 | 23.09 | 23.90 | 50.00 | 1.00 |
| 4 | October | 36.55 | 34.71 | 18.93 | 18.55 | 4.80 | - |
| 5 | November | 28.87 | 27.10 | 13.50 | 12.40 | - | - |
| 6 | December | 24.80 | 26.39 | 7.52 | 9.00 | - | - |
| 7 | January | 16.84 | 20.19 | 7.81 | 6.51 | 5.40 | 8.00 |
| 8 | February | 25.48 | 26.89 | 8.55 | 9.50 | - | 4.00 |
| 9 | March | 32.35 | 32.29 | 15.40 | 14.12 | 25.60 | 1.00 |
| 10 | April | 38.53 | 40.33 | 19.33 | 21.53 | 10.40 | 8.50 |
| 11 | May | 43.13 | 41.90 | 25.00 | 25.81 | 3.00 | 16.60 |
| 12 | June | 43.90 | 40.13 | 28.63 | 26.50 | 30.00 | 79.70 |
| **Total Rainfall = 635 mm** | | | | | | **348.9** | **286.1** |
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# YUSAFWALA - SAHIWAL (HEADQUARTER)

## MAIZE (*Zea mays* L)

## HYBRID MAIZE (YELLOW)

## KHARIF 2016

### 1. GERMPLASM MAINTENANCE

### 1.1 Maintenance of Inbred Lines

Six hundred and thirty four (634) inbred lines were sown ear to row for maintenance during Kharif 2016**.** 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. Data regarding root anthocyanin, leaf sheath anthocyanin, margin serration, leaf margin wave, sheath hairs, leaf senescence, fertility of anthers, pollen shedding, anther color, pollen color, glumes color and silk color were also recorded for all the lines separately. Two hundred and twenty (220) lines were harvested for next cycle of maintenance and purification in Spring 2017.

### 2. GERMPLASM DEVELOPMENT

### 2.1 Derivation of Inbred Families

Four hundred and six (406) derivative families were sown ear to row during Kharif 2015 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 and disease tolerance were self pollinated in all the families. At harvesting two hundred and twenty five (225) derivatives were selected for next cycle of inbreeding / selection in Spring 2017.

### 3 HEAT TOLERANT INBRED LINES

Fifty (50) heat tolerant inbred lines under ADP Project were sown for maintenance and purification through hand pollination. All the lines were fully maintained for next cycle of maintenance and purification.

### 4 MPS MAIZE INBRED LINES OF CIMMYT

Twenty-two (22) inbred lines under CIMMYT Project were sown for maintenance and purification through hand pollination. All the lines were fully maintained for next cycle of maintenance and purification.

### 4 HYBRID CONSTITUTION THROUGH OPEN POLLINATION

### 4.1 Isolation No. 1

Seven female inbred lines were sown with one male in isolation for developing new single crosses on an area of one kanal. These crosses will be evaluated in spring 2017

### 4.2 Isolation No. 2

Sixty female inbred lines were sown with one male in isolation for developing new single crosses on an area of one kanal. These crosses will be evaluated in spring 2017.
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# 5. HYBRID EVALUATION
## Replicated Yield Trials

### 5.1 Preliminary Hybrid Maize Yield Trial No. 1. Kharif 2016

This trial was comprised of forty (32) 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 Table 1.

**Table 1: Results of Preliminary Maize Hybrid Yield Trial No. 1**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 4 | YH-5482 | 9218 | 16.3 | 17.0 | 51.7 | 54.7 | 173.3 | 91.7 | 16.7 |
| 30 | NT-6621 | 9215 | 17.7 | 17.7 | 53.3 | 56.3 | 186.7 | 108.3 | 19.0 |
| 29 | YH-1898 | 8770 | 14.0 | 16.3 | 51.7 | 55.0 | 186.7 | 103.3 | 14.7 |
| 31 | DK-6789 | 8765 | 16.7 | 17.3 | 51.3 | 54.3 | 170.3 | 85.0 | 18.7 |
| 27 | YH-5505 | 7879 | 14.0 | 15.3 | 54.7 | 57.7 | 186.7 | 91.3 | 14.3 |
| 22 | YH-5500 | 7734 | 17.0 | 16.3 | 51.7 | 54.7 | 165.0 | 79.7 | 17.3 |
| 32 | FH-1046 | 7729 | 15.0 | 16.3 | 51.0 | 54.0 | 175.0 | 95.0 | 15.7 |
| 12 | YH-5490 | 7396 | 14.7 | 15.3 | 51.0 | 54.3 | 193.3 | 100.0 | 15.7 |
| 23 | YH-5501 | 6842 | 15.0 | 17.0 | 51.3 | 54.3 | 203.3 | 106.7 | 17.3 |
| 28 | FH-949 | 6812 | 14.0 | 15.3 | 52.3 | 55.3 | 179.0 | 91.7 | 14.7 |
| 15 | YH-5493 | 6773 | 14.0 | 15.0 | 51.0 | 54.0 | 183.3 | 90.0 | 14.7 |
| 26 | YH-5504 | 6695 | 15.3 | 16.0 | 50.3 | 53.3 | 155.0 | 86.7 | 16.3 |
| 20 | YH-5498 | 6124 | 14.3 | 16.3 | 53.0 | 56.0 | 180.0 | 93.3 | 15.0 |
| 25 | YH-5503 | 5950 | 14.0 | 15.3 | 51.0 | 54.0 | 186.7 | 101.7 | 14.7 |
| 2 | YH-5487 | 5833 | 13.3 | 14.0 | 50.3 | 53.3 | 201.7 | 96.7 | 15.3 |
| 5 | YH-5483 | 5798 | 12.3 | 12.7 | 51.7 | 54.7 | 193.3 | 103.3 | 12.7 |
| 10 | YH-5488 | 5757 | 13.7 | 14.7 | 52.7 | 55.7 | 198.3 | 108.3 | 14.0 |
| 9 | YH-5487 | 5754 | 15.3 | 16.7 | 56.3 | 59.7 | 172.7 | 85.7 | 15.7 |
| 8 | YH-5486 | 5676 | 15.0 | 16.0 | 51.0 | 54.0 | 195.0 | 81.7 | 15.7 |
| 24 | YH-5502 | 5669 | 15.3 | 15.0 | 50.7 | 53.7 | 166.7 | 85.0 | 15.3 |
| 14 | YH-5492 | 5541 | 14.3 | 15.0 | 50.7 | 53.7 | 185.7 | 96.7 | 14.7 |
| 19 | YH-5497 | 5518 | 15.7 | 16.0 | 49.0 | 52.0 | 181.7 | 101.7 | 17.3 |
| 21 | YH-5499 | 5345 | 14.3 | 15.0 | 53.0 | 56.3 | 181.7 | 101.7 | 15.3 |
| 11 | YH-5489 | 5283 | 12.7 | 13.7 | 51.3 | 54.3 | 178.3 | 80.0 | 13.7 |
| 7 | YH-5485 | 5241 | 11.3 | 12.3 | 54.0 | 57.0 | 171.7 | 78.3 | 13.3 |
| 16 | YH-5494 | 5230 | 16.3 | 16.0 | 51.0 | 54.0 | 191.7 | 118.3 | 17.0 |
| 17 | YH-5495 | 5228 | 15.0 | 15.0 | 52.3 | 55.3 | 193.3 | 102.7 | 16.0 |
| 6 | YH-5484 | 5181 | 15.3 | 15.3 | 54.3 | 57.3 | 200.0 | 86.7 | 16.0 |
| 13 | YH-5491 | 4687 | 14.3 | 13.3 | 53.0 | 56.0 | 201.7 | 96.7 | 14.7 |
| 18 | YH-5496 | 3999 | 14.7 | 15.3 | 53.3 | 56.3 | 205.0 | 91.7 | 15.0 |
| 1 | YH-5479 | 3948 | 13.0 | 13.7 | 51.3 | 54.3 | 190.7 | 88.3 | 14.3 |
| 3 | YH-5481 | 3123 | 10.0 | 13.0 | 49.7 | 52.7 | 178.3 | 86.7 | 11.3 |
| CV % | | 12.04 | 10.6 | 13.5 | 3.12 | 3.03 | 10.61 | 13.47 | 10.81 |
| $Cd_1$ | | 1502.0 | 3.12 | 4.16 | 3.31 | 3.41 | 3.124 | 4.156 | 3.377 |

It is evident from the results presented in the table that YH-5482 remained at top position by giving 9217.77 kg/ha. YH-5374 seemed to be early maturing by taking 51 days to
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complete its fifty percent. Local hybrid YH-5496 showed maximum plant height (205cm) while YH-5504showed minimum plant height (155 cm). Local hybrid YH- 5485 showed lowest cob bearing (78cm) while YH-5495 showed highest cob bearing (118 cm).

### 5.2 Preliminary Hybrid Maize Yield Trial No. 2. Kharif 2016

This trial was comprised of thirty-two (32) 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 2.

**Table 2: Results of Preliminary Maize Hybrid Yield Trial No. 2**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 30 | NT-6621 | 9027 | 16 | 17 | 51 | 54.5 | 191 | 97.5 | 17 |
| 9 | YH-5514 | 8307 | 14.5 | 16.5 | 50 | 53.5 | 192.5 | 90 | 14.5 |
| 14 | YH-5519 | 7547 | 14.5 | 14 | 51 | 54 | 178.5 | 95 | 14.5 |
| 21 | YH-5526 | 7412 | 13 | 14 | 50.5 | 53.5 | 190 | 95 | 13 |
| 32 | FH-1046 | 7219 | 14 | 13.5 | 50.5 | 53.5 | 186 | 95 | 12 |
| 6 | YH-5511 | 7125 | 14 | 15 | 50.5 | 54 | 190 | 97.5 | 14.5 |
| 23 | YH-5528 | 7020 | 16 | 15.5 | 51.5 | 54.5 | 189 | 97.5 | 15.5 |
| 29 | YH-1898 | 6838 | 15 | 14 | 50 | 53 | 160 | 85 | 15 |
| 10 | YH-5515 | 6760 | 14 | 13 | 52 | 55 | 202.5 | 115 | 15.5 |
| 16 | YH-5521 | 6545 | 16.5 | 15.5 | 50 | 53 | 190 | 97.5 | 17 |
| 31 | DK-6789 | 6445 | 11 | 10.5 | 50.5 | 53.5 | 215 | 95 | 11.5 |
| 19 | YH-5524 | 6434 | 14.5 | 15.5 | 51 | 54 | 187.5 | 95 | 15.5 |
| 12 | YH-5517 | 6011 | 13 | 12 | 50.5 | 53.5 | 190 | 100 | 13.5 |
| 18 | YH-5523 | 5959 | 16.5 | 15.5 | 51.5 | 55 | 177.5 | 97.5 | 16.5 |
| 22 | YH-5527 | 5625 | 11 | 9.5 | 50.5 | 53.5 | 190 | 100 | 11 |
| 7 | YH-5512 | 5343 | 11.5 | 9.5 | 51 | 54 | 182.5 | 95 | 12 |
| 3 | YH-5508 | 5288 | 12 | 12 | 50 | 53 | 165 | 87.5 | 13.5 |
| 5 | YH-5510 | 5213 | 11.5 | 11 | 50.5 | 53.5 | 165 | 70 | 12.5 |
| 25 | YH-5530 | 5106 | 10.5 | 11.5 | 52 | 55 | 181 | 92.5 | 12 |
| 26 | YH-5531 | 4956 | 10 | 11.5 | 53 | 56 | 190 | 95 | 11 |
| 15 | YH-5520 | 4933 | 15.5 | 14 | 51 | 54 | 185 | 90 | 15 |
| 11 | YH-5516 | 4746 | 16 | 15 | 50.5 | 53.5 | 176 | 80 | 15 |
| 13 | YH-5518 | 4211 | 13 | 13 | 50 | 53.5 | 166 | 70 | 14 |
| 8 | YH-5513 | 4062 | 13.5 | 12.5 | 50 | 53 | 127.5 | 70 | 15.33 |
| 1 | YH-5506 | 4050 | 8.5 | 8 | 50 | 53 | 217.5 | 107.5 | 9.5 |
| 20 | YH-5525 | 3906 | 10.5 | 11 | 52 | 55 | 195 | 87.5 | 12 |
| 4 | YH-5509 | 3809 | 8.5 | 7 | 52.5 | 55.5 | 177.5 | 140 | 10 |
| 27 | YH-5532 | 3502 | 10 | 8 | 50 | 53.5 | 182.5 | 82.5 | 11.5 |
| 24 | YH-5529 | 3379 | 16 | 15 | 51 | 54 | 210 | 102.5 | 16 |
| 2 | YH-5507 | 3089 | 11.5 | 11.5 | 50 | 51.5 | 165 | 90 | 12 |
| 28 | FH-949 | 2034 | 11 | 9 | 54 | 57 | 133.5 | 70 | 13 |
| 17 | YH-5522 | 1528 | 7 | 7 | 53 | 56 | 172 | 96 | 8.5 |
| CV% | | 25.46 | 20.3 | 22.5 | 1.68 | 1.69 | 6.38 | 16.32 | 18.11 |
| $Cd_1$ | | 2870.7 | 5.29 | 5.32 | 1.74 | 1.86 | 23.67 | 30.97 | 4.95 |
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It is evident from the results presented in the table that YH-5514, YH-5519 and YH-5403 remained at 2nd, 3rdand4thpositions by giving 9027, 8307.5 and 7547.5 kg/ha respectively.YH-5507 seemed to be early maturing by taking 51 days to complete its fifty percent silks while Local hybrid FH-949 was late maturing taking 57 days to silks. Local hybrid YH-5525 showed maximum plant height (217 cm) and cob height (107 cm). Local hybrid YH-5530 showed low cob bearing (70cm).

### 5.3 CKD Maize Hybrid Trial.

This trial was comprised of sixty-three (63) 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 3.

**Table 3: CKD Maize Hybrid Trial**

| E. No. | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|
| 54 | 8672 | 16 | 16 | 53 | 57 | 213 | 104 | 17 |
| 60 | 7282 | 18 | 24 | 53 | 56 | 186 | 97 | 19 |
| 10 | 7187 | 14 | 14 | 53 | 56 | 196 | 93 | 17 |
| 7 | 6925 | 13 | 15 | 54 | 58 | 197 | 103 | 15 |
| 20 | 6821 | 15 | 15 | 58 | 60 | 184 | 89 | 17 |
| 44 | 6530 | 16 | 17 | 53 | 57 | 185 | 92 | 17 |
| 33 | 6443 | 12 | 13 | 53 | 56 | 198 | 98 | 16 |
| 8 | 6340 | 15 | 18 | 57 | 59 | 188 | 93 | 17 |
| 9 | 6014 | 14 | 14 | 54 | 55 | 206 | 104 | 15 |
| 19 | 5796 | 14 | 13 | 53 | 56 | 188 | 89 | 14 |
| 61 | 5776 | 15 | 14 | 54 | 58 | 185 | 93 | 17 |
| 23 | 5757 | 16 | 16 | 54 | 59 | 203 | 90 | 16 |
| 32 | 5753 | 17 | 17 | 56 | 59 | 181 | 91 | 17 |
| 22 | 5731 | 15 | 15 | 55 | 59 | 205 | 112 | 17 |
| 24 | 5731 | 12 | 13 | 54 | 55 | 200 | 96 | 15 |
| 31 | 5656 | 12 | 12 | 54 | 58 | 202 | 103 | 15 |
| 14 | 5650 | 16 | 15 | 52 | 56 | 203 | 107 | 16 |
| 47 | 5507 | 14 | 14 | 55 | 57 | 189 | 83 | 15 |
| 28 | 5490 | 14 | 14 | 53 | 56 | 176 | 86 | 15 |
| 17 | 5487 | 12 | 13 | 52 | 56 | 192 | 88 | 16 |
| 63 | 5400 | 10 | 12 | 54 | 55 | 176 | 91 | 13 |
| 12 | 5443 | 11 | 13 | 53 | 56 | 184 | 89 | 14 |
| 41 | 5264 | 13 | 13 | 55 | 57 | 200 | 102 | 16 |
| 21 | 5177 | 16 | 17 | 53 | 55 | 183 | 98 | 18 |
| 43 | 5104 | 12 | 14 | 56 | 58 | 211 | 100 | 15 |
| 35 | 5103 | 12 | 12 | 53 | 55 | 217 | 109 | 16 |
| 49 | 5078 | 12 | 12 | 53 | 56 | 180 | 86 | 16 |
| 40 | 5003 | 11 | 11 | 53 | 56 | 198 | 98 | 13 |
| 27 | 4991 | 11 | 12 | 53 | 56 | 215 | 100 | 14 |
| 16 | 4814 | 13 | 13 | 55 | 58 | 167 | 84 | 15 |
| 59 | 4758 | 12 | 11 | 53 | 57 | 195 | 95 | 15 |
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|---|---|---|---|---|---|---|---|---|
| 36 | 4705 | 10 | 12 | 54 | 57 | 190 | 93 | 15 |
| 53 | 4704 | 11 | 13 | 55 | 58 | 185 | 93 | 14 |
| 39 | 4693 | 11 | 13 | 56 | 59 | 216 | 114 | 17 |
| 50 | 4684 | 11 | 11 | 57 | 59 | 193 | 118 | 14 |
| 37 | 4637 | 14 | 15 | 54 | 56 | 176 | 84 | 17 |
| 52 | 4601 | 12 | 14 | 53 | 55 | 193 | 97 | 15 |
| 18 | 4591 | 11 | 11 | 56 | 58 | 166 | 99 | 13 |
| 30 | 4524 | 14 | 21 | 56 | 61 | 177 | 88 | 17 |
| 55 | 4401 | 12 | 12 | 53 | 54 | 194 | 104 | 16 |
| 5 | 4242 | 13 | 13 | 52 | 56 | 178 | 88 | 18 |
| 46 | 4161 | 15 | 15 | 53 | 57 | 178 | 93 | 16 |
| 57 | 4147 | 15 | 14 | 53 | 57 | 175 | 91 | 18 |
| 13 | 4093 | 15 | 14 | 54 | 56 | 203 | 88 | 16 |
| 56 | 4054 | 12 | 12 | 56 | 59 | 152 | 70 | 15 |
| 48 | 4037 | 14 | 14 | 53 | 55 | 200 | 98 | 15 |
| 3 | 3732 | 11 | 11 | 52 | 57 | 175 | 78 | 15 |
| 26 | 3648 | 11 | 11 | 56 | 59 | 207 | 91 | 13 |
| 45 | 3432 | 11 | 11 | 53 | 57 | 188 | 100 | 16 |
| 11 | 3351 | 11 | 11 | 55 | 58 | 184 | 103 | 14 |
| 15 | 3265 | 10 | 12 | 54 | 57 | 174 | 87 | 15 |
| 4 | 3252 | 11 | 11 | 56 | 59 | 167 | 90 | 14 |
| 6 | 3068 | 12 | 12 | 55 | 57 | 148 | 80 | 14 |
| 1 | 3057 | 12 | 12 | 55 | 57 | 183 | 100 | 17 |
| 29 | 3051 | 12 | 12 | 54 | 57 | 186 | 78 | 12 |
| 58 | 3041 | 10 | 9 | 55 | 60 | 159 | 83 | 12 |
| 34 | 3026 | 15 | 16 | 56 | 59 | 173 | 83 | 16 |
| 42 | 3023 | 10 | 9 | 55 | 58 | 184 | 87 | 12 |
| 38 | 2711 | 15 | 14 | 56 | 58 | 163 | 71 | 16 |
| 25 | 2698 | 11 | 11 | 52 | 56 | 173 | 106 | 15 |
| 62 | 2580 | 8 | 8 | 56 | 60 | 192 | 104 | 13 |
| 2 | 1602 | 13 | 13 | 56 | 59 | 163 | 77 | 17 |
| 51 | 1236 | 7 | 7 | 57 | 60 | 191 | 96 | 12 |
| **CV%** | 36.93 | 26.37 | 28.1 | 2.97 | 2.91 | 10.75 | 15.3 | 18.66 |
| **Cd $_1$** | 3467.3 | 6.61 | 7.32 | 3.19 | 3.31 | 40.14 | 28.58 | 5.65 |

It is evident from the results presented in the table that Hybrids with code 54, 60 and 10out yielded all other entries by giving i.e. 8672 kg/ha, 7282 kg/ha and 7187 kg/ha, respectively. Entry No. 55 seemed to be early maturing by taking 54 days to complete its fifty percent silks while Entry No. 30was late maturing taking 61 days to silks. Entry 35 showed maximum plant height (217 cm) while Entry 4 showed minimum (148 cm) plant height. Entry No. 39 showed maximum cob height (118 cm) while lowest cob bearing (71 cm) was observed in Entry 38.

### 5.3 Demonstration of local Maize hybrid in comparison to commercial hybrids.

This trial was comprised of fifteen (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 8 m x 0.75 x 6. The data regarding various parameters are presented in the following Table 4.
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**Table 4: Results of Demonstration trials of hybrid maize with comparison to commercial hybrids Kharif 2016**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 1 | YH-1898 | 8825 | 201 | 205 | 54 | 56 | 180 | 105 | 201 |
| 2 | DK-6789 | 8775 | 202 | 206 | 53 | 55 | 190 | 90 | 203 |
| 3 | YH-5482 | 8570 | 198 | 203 | 55 | 59 | 170 | 65 | 202 |
| 4 | NT-6621 | 8020 | 199 | 01 | 54 | 57 | 180 | 80 | 199 |
| 5 | FH-1036 | 7960 | 198 | 200 | 61 | 63 | 163 | 88 | 199 |
| 6 | YH-1899 | 7720 | 204 | 205 | 56 | 59 | 175 | 85 | 205 |
| 7 | FH-1046 | 7670 | 197 | 200 | 54 | 57 | 175 | 95 | 207 |
| 8 | FH-988 | 7500 | 203 | 205 | 57 | 59 | 165 | 97 | 208 |
| 9 | FH-922 | 6980 | 200 | 205 | 55 | 58 | 178 | 102 | 200 |
| 10 | YH-5521 | 6620 | 205 | 202 | 56 | 59 | 160 | 85 | 207 |
| 11 | YH-5490 | 6590 | 200 | 200 | 60 | 62 | 170 | 85 | 200 |
| 12 | FH-1012 | 6000 | 199 | 205 | 59 | 62 | 135 | 60 | 200 |
| 13 | FH-949 | 5670 | 204 | 200 | 58 | 61 | 160 | 80 | 205 |

It is evident from the results presented in the table that YH-1898 and YH-5482out yielded all prominent commercial hybrids i.e. DK-6789 and NT-6621 used as check giving 8825 kg/ha& 8570 kg/ha, respectively. YH 1858 seemed to be early maturing by taking 56 days to complete its fifty percent silks while FH-1036was late maturing taking 63 days to silks. Local hybrid YH-1898 showed maximum cob height (105 cm) while local hybrid FH-1012 showed minimum cob bearing (60cm). Commercial hybrid DK-6789 showed maximum plant height (190 cm).

## 5.4 NATIONAL UNIFORM MAIZE HYBRID YIELD TRIAL KHARIF 2016

This trial was planted with forty two (42) entries having plot size of 4mx0.75mx2 with three replications. The data regarding various parameters are presented in the following Table 5.

**Table 5: Results of National Uniform Maize Yield Trial Kharif 2016**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 19 | 10022 | 36 | 33 | 50 | 52 | 225 | 109 | 35 |
| 2 | 22 | 9156 | 33 | 34 | 49 | 51 | 207 | 105 | 35 |
| 3 | 25 | 9089 | 31 | 30 | 52 | 55 | 226 | 118 | 33 |
| 4 | 7 | 8867 | 32 | 32 | 50 | 53 | 218 | 105 | 36 |
| 5 | 33 | 8867 | 34 | 33 | 48 | 51 | 221 | 106 | 36 |
| 6 | 28 | 8828 | 38 | 32 | 48 | 51 | 232 | 110 | 36 |
| 7 | 41 | 8656 | 31 | 30 | 49 | 52 | 212 | 113 | 35 |
| 8 | 29 | 8622 | 32 | 28 | 51 | 54 | 218 | 114 | 34 |
| 9 | 6 | 8622 | 30 | 33 | 56 | 59 | 224 | 111 | 34 |
| 10 | 39 | 8567 | 33 | 32 | 50 | 53 | 214 | 93 | 34 |
| 11 | 13 | 8511 | 34 | 35 | 49 | 52 | 214 | 97 | 35 |
| 12 | 38 | 8417 | 30 | 28 | 52 | 55 | 190 | 96 | 35 |
| 13 | 11 | 8389 | 33 | 33 | 53 | 55 | 216 | 100 | 35 |
| 14 | 20 | 8233 | 34 | 33 | 51 | 53 | 207 | 85 | 35 |
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|---|---|---|---|---|---|---|---|---|---|
| 15 | 36 | 8178 | 33 | 31 | 48 | 51 | 212 | 106 | 33 |
| 16 | 24 | 8133 | 30 | 27 | 51 | 55 | 205 | 96 | 33 |
| 17 | 12 | 8050 | 31 | 30 | 47 | 49 | 206 | 91 | 38 |
| 18 | 18 | 8028 | 29 | 29 | 52 | 55 | 212 | 107 | 35 |
| 19 | 5 | 7956 | 29 | 25 | 48 | 52 | 217 | 103 | 28 |
| 20 | 42 | 7906 | 33 | 33 | 50 | 53 | 210 | 103 | 36 |
| 21 | 26 | 7822 | 27 | 26 | 52 | 54 | 212 | 102 | 31 |
| 22 | 8 | 7778 | 26 | 26 | 51 | 54 | 219 | 109 | 33 |
| 23 | 30 | 7708 | 36 | 33 | 51 | 55 | 212 | 106 | 37 |
| 24 | 31 | 7528 | 33 | 32 | 49 | 51 | 212 | 103 | 36 |
| 25 | 37 | 7383 | 26 | 27 | 50 | 53 | 222 | 109 | 32 |
| 26 | 23 | 7222 | 35 | 28 | 49 | 51 | 209 | 107 | 33 |
| 27 | 10 | 7171 | 32 | 31 | 49 | 52 | 219 | 103 | 35 |
| 28 | 17 | 7150 | 33 | 32 | 50 | 53 | 206 | 103 | 35 |
| 29 | 27 | 7144 | 27 | 30 | 48 | 51 | 200 | 98 | 31 |
| 30 | 21 | 6783 | 31 | 30 | 48 | 51 | 189 | 109 | 34 |
| 31 | 32 | 6733 | 35 | 34 | 53 | 56 | 195 | 95 | 36 |
| 32 | 40 | 6506 | 27 | 26 | 50 | 53 | 191 | 98 | 33 |
| 33 | 2 | 6400 | 24 | 26 | 53 | 55 | 195 | 97 | 27 |
| 34 | 9 | 6239 | 33 | 25 | 52 | 55 | 198 | 98 | 34 |
| 35 | 34 | 5844 | 23 | 26 | 54 | 57 | 203 | 97 | 44 |
| 36 | 14 | 5744 | 27 | 28 | 60 | 62 | 224 | 102 | 27 |
| 37 | 35 | 5678 | 27 | 26 | 58 | 60 | 179 | 98 | 33 |
| 38 | 1 | 5594 | 25 | 26 | 54 | 57 | 196 | 105 | 26 |
| 39 | 3 | 5256 | 28 | 28 | 60 | 63 | 194 | 97 | 28 |
| 40 | 15 | 4850 | 23 | 23 | 51 | 54 | 185 | 77 | 29 |
| 41 | 16 | 4500 | 27 | 29 | 50 | 53 | 172 | 86 | 33 |
| 42 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CV% | | 13.26 | 12.03 | 12.31 | 9.21 | 4.18 | 7.26 | 11.29 | 15.17 |

It is evident from the results presented in the table that Hybrids with code 19, 22 and 25 out yielded all other entries by giving i.e. 10022 kg/ha, 9156 kg/ha and 9089 kg/ha, respectively. Entry No. 12 seemed to be early maturing by taking 42 days to complete its fifty percent silks while Entry No. 3was late maturing taking 63 days to silks. Entry28 showed maximum plant height (224 cm) while Entry 16 showed minimum (172cm) plant height.

# SPRING 2017

## 1. GERMPLASM MAINTENANCE

### 1.1 Maintenance of Inbred Lines

Three hundred and ninety nine inbred lines (399) were sown ear to row for maintenance during Spring 2017**.** 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. Data regarding root anthocyanin, leaf sheath anthocyanin, margin serration, leaf margin wave, sheath hairs, leaf senescence,
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fertility of anthers, pollen shedding, anther color, pollen color, glumes color and silk color were also recorded for all the lines separately. Whole inbred lines were harvested for next cycle of maintenance and purification.

## 2. GERMPLASM DEVELOPMENT

### 2.1 Derivation of Inbred Families

Four hundred and sixty eight (468) derivative families were sown ear to row during Spring 2017 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 and disease tolerance were self pollinated in all the families. At harvesting two hundred and sixty two (262) derivatives were selected for next cycle of inbreeding / selection in Kharif 2017.

## 3. GERMPLASM ENHANCEMENT

### 3.1 Screening of Maize Germplasm Tolerant to Stalk Rot

Eight hundred and sixty seven (867) lines were planted under this project. True to type plants were selected for self pollination. All the selfed plants were inoculated for stalk rot by pathogen carrier toothpicks at second node from the base. At harvesting stems of the selfed 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.

### 3.2 Development of Inbred Lines Tolerant to Stalk Rot

Four hundred and sixty eight (468) derivatives segregating lines/families were sown ear to row for development of lines tolerant to stalk rot. Plants selected on the basis of desirable traits were self pollinated in all the families. The selfed families were inoculated for stalk rot by pathogen carrier toothpicks at second node from the base. At harvest, stems of the selfed plants were torn apart with the help of scalpel to see the penetration of pathogen below or above the point of insertion of pathogen carrier 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 families, respectively. In case of infection reached to the second inter node, the plant was declared susceptible and thus rejected.

### 3.3 Development of Heat Resilient Maize Inbred Lines under Natural Conditions

During spring 2017 fifty (50) lines were sown for screening of inbred lines for high temperature. At flowering the temperatures remained above 40$^{o}$C. At harvesting forty lines set seed. The seed was kept for next cycle of planting and selection under high temperature.
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## 4. HYBRID CONSTITUTION/DEVELOPMENT OF NEW SINGLE CROSSES IN ISOLATION BLOCKS

### 4.1 Hybrid Constitution.

**Isolation No. 01**

Y-9 was used as female with Y-36 as male on an area of 10 Marla for the production of YH-5140. The female lines were detasseled prior to the dehiscence of pollen. The seed developed on the female lines (19.0 Kg) was harvested for testing in NUMYT and on farm.

**Isolation No. 02**

Twenty seven (27) promising inbred lines were used as female with Y-27 as male on an area of one kanal for the production of twenty seven new single crosses. The female lines were detasseled prior to the dehiscence of pollen. These crosses will be tested in preliminary yield trials in Kharif 2017. The best performing single crosses will be selected.

**Isolation No. 03**

Nine promising inbred lines were used as female with Y-36 as male on an area of 5 Marla for the production of nine new single crosses. The female lines were detasseled prior to the dehiscence of pollen. These crosses will be tested in preliminary yield trials in Kharif 2017. The best performing single crosses will be selected.

### 4.2 Seed Increase of Inbred Lines in Isolation Blocks

**Isolation No. 04**

Y-9 was planted in tunnel for seed increase on 13-01-2017. The plastic sheets were used to enhance the temperature at germination. At harvesting 41 kg seed was harvested.

**Isolation No. 05**

Y-36 was planted for seed increase. The crop showed high sensitivity to temperature at flowering. However at harvesting 05 kg seed was harvested.

## 5 HYBRID SEASON EVALUATION UNDER NORMAL Replicated Yield Trials

### 5.1 Preliminary Maize Hybrid Yield Trial No. 1 Spring 2017

This trial was comprised of twenty seven (27) 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 4m x 0.75mx1. The data regarding various parameters are presented in the following Table 6.

**Table 6: Results of Preliminary Maize Hybrid Yield Trial No. 1**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 1 | YH-5533 | 10250 | 18 | 21 | 73 | 75 | 198 | 98 | 18 |
| 5 | YH-5535 | 10000 | 20 | 24 | 72 | 75 | 190 | 118 | 21 |
| 7 | YH-5427 | 9950 | 18 | 21 | 72 | 74 | 185 | 115 | 19 |
| 27 | HC-9091 | 9584 | 18 | 18 | 72 | 74 | 218 | 105 | 18 |
| 24 | DK-6724 | 9484 | 17 | 17 | 72 | 74 | 200 | 103 | 16 |
| 19 | YH-5547 | 9400 | 18 | 19 | 71 | 74 | 195 | 110 | 18 |
| 26 | P-1543 | 9400 | 18 | 18 | 71 | 74 | 208 | 108 | 18 |
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|---|---|---|---|---|---|---|---|---|---|
| 17 | YH-5545 | 8950 | 17 | 18 | 74 | 77 | 198 | 113 | 16 |
| 23 | NK-8711 | 8834 | 16 | 16 | 72 | 75 | 190 | 93 | 17 |
| 16 | YH-5544 | 8784 | 17 | 18 | 72 | 75 | 190 | 105 | 18 |
| 12 | YH-5540 | 8467 | 18 | 20 | 71 | 74 | 205 | 110 | 20 |
| 6 | YH-5536 | 8450 | 17 | 17 | 73 | 76 | 173 | 108 | 17 |
| 21 | YH-5549 | 8433 | 19 | 20 | 75 | 78 | 198 | 108 | 20 |
| 22 | YH-5550 | 8384 | 17 | 18 | 73 | 77 | 230 | 113 | 17 |
| 18 | YH-5546 | 8367 | 18 | 18 | 75 | 78 | 195 | 108 | 17 |
| 11 | YH-5539 | 8317 | 18 | 18 | 73 | 76 | 193 | 90 | 18 |
| 2 | YH-5411 | 8000 | 18 | 18 | 75 | 77 | 188 | 100 | 18 |
| 25 | YH-1898 | 8000 | 17 | 17 | 75 | 78 | 193 | 113 | 17 |
| 3 | YH-5213 | 7900 | 17 | 18 | 73 | 75 | 180 | 113 | 17 |
| 13 | YH-5541 | 7884 | 18 | 18 | 75 | 77 | 205 | 113 | 19 |
| 10 | YH-5140 | 7784 | 19 | 20 | 73 | 76 | 188 | 110 | 21 |
| 20 | YH-5548 | 7600 | 17 | 17 | 71 | 73 | 188 | 98 | 18 |
| 8 | YH-5537 | 7484 | 17 | 18 | 74 | 76 | 190 | 108 | 19 |
| 4 | YH-5534 | 7433 | 17 | 18 | 74 | 77 | 180 | 98 | 18 |
| 15 | YH-5543 | 7417 | 17 | 17 | 72 | 75 | 183 | 100 | 17 |
| 9 | YH-5538 | 7150 | 18 | 18 | 74 | 76 | 178 | 95 | 21 |
| 14 | YH-5542 | 6884 | 18 | 17 | 74 | 77 | 200 | 103 | 19 |
| CV% | | 10.5 | 8.6 | 9.5 | 1.2 | 1.3 | 5.4 | 9.0 | 8.6 |
| $Cd_1$ | | 1834.9 | 1.9 | 3.5 | 1.7 | 2.0 | 16.7 | 19.5 | 3.2 |

It is evident from the results presented in the table that YH-5533 out yielded all prominent commercial hybrids i.e. HC-9091, DK 6724 and P-1543 used as multinational hybrids giving 9584 kg/ha, 9484 kg/ha & 9400 kg/ha respectively. YH 5548 seemed to be early maturing by taking 73 days to complete its fifty percent silks while hybrid YH-5549 & YH-5546 were late maturing taking 78 days to silks. YH-5550 showed maximum plant height (230 cm) while YH-5536 showed minimum plant height (173 cm). Local hybrid YH-5539 showed low cob bearing (90 cm) while YH-5535 showed high cob bearing (118 cm).

### 5.2 Micro Plot Hybrid Maize Yield Trial No.01 Spring 2017

This trial was comprised of twenty seven (27) 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 4m x 0.75mx1. The data regarding various parameters are presented in the following Table 7.

**Table 7: Results of Micro Plot Hybrid Maize Yield Trial**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 27 | YH-1898 | 12550 | 20 | 25 | 75 | 77 | 188 | 108 | 21 |
| 26 | DK-6724 | 10817 | 20 | 20 | 72 | 74 | 203 | 93 | 21 |
| 4 | YH-5482 | 9967 | 20 | 20 | 73 | 75 | 180 | 88 | 21 |
| 8 | YH-5486 | 9417 | 21 | 21 | 74 | 76 | 190 | 110 | 21 |
| 11 | YH-5490 | 9050 | 20 | 20 | 75 | 78 | 205 | 108 | 21 |
| 7 | YH-5485 | 8883 | 20 | 20 | 76 | 79 | 208 | 103 | 21 |
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|---|---|---|---|---|---|---|---|---|---|
| 25 | NK-8711 | 8800 | 21 | 16 | 72 | 74 | 175 | 73 | 21 |
| 9 | YH-5487 | 8700 | 18 | 20 | 74 | 76 | 188 | 93 | 19 |
| 22 | YH-5504 | 8550 | 19 | 20 | 73 | 76 | 185 | 88 | 20 |
| 21 | YH-5502 | 8387 | 17 | 18 | 73 | 76 | 185 | 88 | 19 |
| 23 | YH-5505 | 8272 | 18 | 18 | 75 | 77 | 190 | 93 | 18 |
| 14 | YH-5493 | 8033 | 20 | 19 | 74 | 76 | 208 | 103 | 22 |
| 20 | YH-5501 | 7613 | 17 | 18 | 74 | 77 | 155 | 83 | 17 |
| 10 | YH-5489 | 7417 | 18 | 19 | 76 | 78 | 198 | 95 | 19 |
| 6 | YH-5484 | 7184 | 19 | 18 | 74 | 76 | 198 | 103 | 19 |
| 18 | YH-5499 | 7133 | 17 | 19 | 76 | 78 | 190 | 95 | 18 |
| 1 | YH-5479 | 7098 | 17 | 16 | 74 | 76 | 183 | 100 | 17 |
| 16 | YH-5495 | 6717 | 17 | 22 | 72 | 74 | 185 | 98 | 18 |
| 2 | YH-5480 | 6600 | 18 | 17 | 75 | 77 | 188 | 98 | 19 |
| 13 | YH-5492 | 6367 | 17 | 17 | 75 | 77 | 203 | 95 | 17 |
| 15 | YH-5494 | 6256 | 11 | 18 | 75 | 77 | 200 | 98 | 11 |
| 12 | YH-5491 | 6083 | 16 | 14 | 75 | 77 | 200 | 95 | 17 |
| 3 | YH-5481 | 5669 | 19 | 17 | 73 | 75 | 193 | 103 | 19 |
| 19 | YH-5500 | 5352 | 17 | 18 | 74 | 78 | 158 | 75 | 18 |
| 24 | YH-5506 | 5252 | 18 | 15 | 72 | 74 | 163 | 75 | 19 |
| 17 | YH-5496 | 4900 | 16 | 16 | 76 | 78 | 173 | 85 | 17 |
| 5 | YH-5483 | 1444 | 18 | 18 | 81 | 84 | 150 | 68 | 17 |
| CV% | | 18.5 | | 10.9 | 1.0 | 0.9 | 7.6 | 14.4 | 10 |
| $Cd_1$ | | 2856 | | 4.1 | 1.4 | 1.5 | 29.1 | 27.5 | 3.8 |

It is evident from the results presented in the Table 7 that YH-1898 out yielded all prominent commercial hybrids i.e. DK-6724, NK-8711 used as check giving 12550 kg/ha, 10817 kg/ha & 8800 kg/ha respectively. DK-6724, NK-8711 seemed to be early maturing by taking 74 days to complete its fifty percent silks while local hybrid YH-5483 was late maturing taking 84 days to silks. Local hybrid YH-5485 showed maximum plant height (208 cm) while YH-5483 showed minimum plant height (150 cm). Local hybrid 5483 showed low cob bearing (68 cm) while YH-5486 showed high cob bearing (110 cm).

### 5.3 Micro Plot Hybrid Maize Yield Trial No.02 Spring 2017

This trial was comprised of twenty seven (27) 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 4m x 0.75mx1. The data regarding various parameters are presented in the following Table 8.

**Table 8: Results of Micro Plot Hybrid Maize Yield Trial**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 23 | YH-5531 | 12684 | 18 | 19 | 75 | 77 | 195 | 103 | 18 |
| 24 | YH-5532 | 12126 | 18 | 18 | 75 | 77 | 200 | 103 | 19 |
| 2 | YH-5508 | 11511 | 18 | 19 | 73 | 76 | 170 | 103 | 18 |
| 25 | NK-8711 | 11433 | 21 | 22 | 72 | 74 | 180 | 95 | 21 |
| 5 | YH-5511 | 11150 | 19 | 24 | 74 | 76 | 195 | 103 | 19 |
| 20 | YH-5528 | 10515 | 17 | 18 | 74 | 76 | 195 | 108 | 17 |
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|---|---|---|---|---|---|---|---|---|---|
| 8 | YH-5515 | 10449 | 19 | 18 | 75 | 78 | 198 | 100 | 19 |
| 16 | YH-5523 | 10081 | 18 | 18 | 74 | 77 | 183 | 90 | 18 |
| 13 | YH-5520 | 9969 | 19 | 18 | 76 | 78 | 185 | 90 | 20 |
| 7 | YH-5514 | 9950 | 21 | 19 | 75 | 77 | 195 | 105 | 22 |
| 19 | YH-5527 | 9850 | 18 | 19 | 76 | 78 | 188 | 100 | 19 |
| 27 | YH-1898 | 9717 | 21 | 19 | 75 | 77 | 203 | 120 | 22 |
| 4 | YH-5510 | 9619 | 18 | 18 | 74 | 76 | 175 | 90 | 18 |
| 22 | YH-5530 | 9439 | 17 | 18 | 74 | 76 | 198 | 98 | 18 |
| 12 | YH-5519 | 9426 | 18 | 18 | 75 | 77 | 188 | 95 | 18 |
| 17 | YH-5524 | 9235 | 19 | 18 | 76 | 78 | 198 | 95 | 20 |
| 26 | DK-6724 | 9067 | 20 | 16 | 71 | 74 | 200 | 100 | 21 |
| 21 | YH-5529 | 9066 | 17 | 17 | 73 | 76 | 185 | 93 | 17 |
| 11 | YH-5518 | 8995 | 18 | 20 | 75 | 76 | 195 | 95 | 19 |
| 6 | YH-5513 | 8890 | 18 | 18 | 72 | 74 | 170 | 78 | 19 |
| 3 | YH-5509 | 8883 | 17 | 20 | 74 | 76 | 185 | 98 | 18 |
| 15 | YH-5522 | 8831 | 17 | 18 | 79 | 81 | 183 | 93 | 18 |
| 9 | YH-5516 | 8769 | 19 | 17 | 74 | 76 | 180 | 93 | 19 |
| 14 | YH-5521 | 8727 | 19 | 17 | 74 | 77 | 203 | 115 | 19 |
| 18 | YH-5525 | 8672 | 18 | 18 | 74 | 76 | 205 | 105 | 18 |
| 10 | YH-5517 | 8643 | 17 | 17 | 76 | 78 | 203 | 108 | 17 |
| 1 | YH-5507 | 5598 | 18 | 18 | 74 | 77 | 160 | 80 | 19 |
| CV% | | 17.5 | 4.4 | 10.0 | 1.2 | 1.6 | 5.2 | 11.1 | 7.1 |
| $Cd_1$ | | 3478 | 1.7 | 3.8 | 1.9 | 2.4 | 20.2 | 22.3 | 2.7 |

It is evident from the results presented in the Table 8 that YH-5531 out yielded all prominent commercial NK-8711 and DK-6724, used as check giving 12684 kg/ha, 11433 kg/ha & 9067 kg/ha respectively. NK-8711 and DK-6724 seemed to be early maturing by taking 74 days to complete its fifty percent silks while YH-5522 was late maturing taking 81 days to silks. YH-5525 showed maximum plant height (205 cm) while YH-5507 showed minimum plant height (160 cm). YH-5513 showed low cob bearing (78 cm) YH-1898 showed high cob bearing (120 cm).

### 5.4 Demonstration of Local Maize Hybrids in Comparison to Commercial Hybrids under Normal Conditions Spring 2017

This trial was comprised of sixty (60) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in strip. Plot size was kept 4m x 075 m x4. The data regarding various parameters are presented in the following Table 9.

**Table 9: Results of demonstration of local maize hybrids in comparison to commercial hybrids spring 2017**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 1 | KSC-9617 | 13499 | 93 | 89 | 74 | 77 | 195 | 95 | 95 |
| 2 | YH-5411 | 13400 | 81 | 80 | 75 | 78 | 195 | 115 | 82 |
| 3 | KSC-9633 | 13189 | 83 | 82 | 75 | 77 | 220 | 115 | 91 |
| 4 | YH-5507 | 12975 | 82 | 80 | 79 | 82 | 175 | 85 | 83 |
| 5 | YH-5515 | 12607 | 87 | 81 | 79 | 82 | 220 | 135 | 90 |
| 6 | YH-5536 | 12607 | 80 | 81 | 74 | 77 | 180 | 105 | 84 |
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|---|---|---|---|---|---|---|---|---|---|
| 7 | YH-5519 | 12392 | 80 | 81 | 75 | 78 | 170 | 90 | 81 |
| 8 | DK-9108 | 12160 | 80 | 79 | 73 | 77 | 230 | 100 | 82 |
| 9 | NK-8711 | 11855 | 79 | 80 | 70 | 74 | 200 | 100 | 82 |
| 10 | HC-9091 | 11516 | 81 | 83 | 71 | 75 | 215 | 110 | 83 |
| 11 | FH-793 | 11477 | 80 | 81 | 80 | 83 | 200 | 130 | 82 |
| 12 | YH-5533 | 11460 | 85 | 80 | 71 | 75 | 210 | 120 | 86 |
| 13 | YH-5427 | 11315 | 82 | 81 | 78 | 81 | 185 | 105 | 95 |
| 14 | YH-5542 | 11156 | 83 | 81 | 75 | 77 | 185 | 105 | 85 |
| 15 | FH-1292 | 11117 | 85 | 82 | 78 | 81 | 240 | 140 | 85 |
| 16 | YH-5492 | 11089 | 82 | 80 | 77 | 79 | 205 | 100 | 84 |
| 17 | DK-6724 | 11081 | 78 | 83 | 71 | 74 | 210 | 115 | 81 |
| 18 | KSC-9618 | 11052 | 90 | 90 | 77 | 79 | 215 | 90 | 103 |
| 19 | FH-988 | 11002 | 79 | 80 | 79 | 81 | 235 | 150 | 80 |
| 20 | FH-949 | 10980 | 82 | 81 | 75 | 78 | 210 | 115 | 86 |
| 21 | YH-5516 | 10975 | 78 | 80 | 71 | 75 | 185 | 85 | 81 |
| 22 | YH-1898 | 10858 | 82 | 80 | 78 | 81 | 175 | 105 | 82 |
| 23 | KSC-5971 | 10794 | 84 | 84 | 74 | 77 | 210 | 100 | 90 |
| 24 | SHG-43 | 10788 | 78 | 80 | 70 | 74 | 185 | 100 | 80 |
| 25 | P-1543 | 10781 | 83 | 81 | 71 | 75 | 200 | 105 | 90 |
| 26 | YH-1899 | 10637 | 83 | 80 | 77 | 80 | 205 | 110 | 82 |
| 27 | YH-5510 | 10625 | 84 | 83 | 75 | 78 | 160 | 85 | 85 |
| 28 | YH-5535 | 10622 | 80 | 80 | 70 | 74 | 200 | 115 | 80 |
| 29 | YH-5485 | 10514 | 87 | 85 | 77 | 80 | 205 | 85 | 87 |
| 30 | YH-5514 | 10481 | 75 | 73 | 77 | 80 | 205 | 105 | 90 |
| 31 | YH-5545 | 10474 | 82 | 82 | 75 | 78 | 200 | 125 | 83 |
| 32 | YH-5486 | 10243 | 80 | 77 | 77 | 80 | 215 | 110 | 90 |
| 33 | YH-5517 | 10213 | 85 | 83 | 76 | 79 | 195 | 80 | 89 |
| 34 | YH-5482 | 9850 | 88 | 85 | 74 | 78 | 185 | 85 | 97 |
| 35 | HC-2040 | 9823 | 78 | 81 | 70 | 74 | 225 | 100 | 80 |
| 36 | YH-5524 | 9755 | 79 | 82 | 78 | 81 | 205 | 100 | 79 |
| 37 | YH-5491 | 9582 | 85 | 83 | 78 | 81 | 190 | 85 | 84 |
| 38 | YH-5493 | 9576 | 74 | 77 | 75 | 78 | 220 | 105 | 91 |
| 39 | YH-5213 | 9440 | 81 | 80 | 74 | 77 | 185 | 100 | 82 |
| 40 | YH-5494 | 9294 | 83 | 81 | 75 | 78 | 230 | 135 | 83 |
| 41 | MV-531 | 9230 | 76 | 78 | 68 | 73 | 225 | 120 | 78 |
| 42 | YH-5550 | 9219 | 81 | 79 | 74 | 77 | 225 | 120 | 82 |
| 43 | YH-5490 | 9141 | 90 | 87 | 77 | 80 | 170 | 85 | 98 |
| 44 | MV-633 | 9103 | 72 | 86 | 70 | 74 | 230 | 120 | 72 |
| 45 | YH-5521 | 9099 | 85 | 83 | 78 | 81 | 215 | 125 | 85 |
| 46 | Maxima | 9094 | 75 | 76 | 68 | 73 | 200 | 105 | 73 |
| 47 | YH-5529 | 9084 | 86 | 84 | 74 | 77 | 175 | 70 | 86 |
| 48 | YH-5509 | 9040 | 84 | 82 | 75 | 78 | 185 | 90 | 84 |
| 49 | YH-5518 | 9028 | 80 | 84 | 76 | 80 | 175 | 85 | 80 |
| 50 | CZP-13002 | 9008 | 79 | 78 | 74 | 77 | 210 | 125 | 80 |
| 51 | MV-600-4 | 8824 | 80 | 98 | 70 | 74 | 210 | 115 | 82 |
| 52 | YH-5534 | 8713 | 85 | 85 | 75 | 78 | 165 | 100 | 81 |
| 53 | MV-600-2 | 8704 | 77 | 84 | 69 | 73 | 225 | 135 | 78 |
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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 54 | YH-5140 | 8572 | 78 | 82 | 78 | 77 | 190 | 105 | 80 |
| 55 | YH-5532 | 8437 | 78 | 78 | 80 | 83 | 220 | 135 | 80 |
| 56 | YH-5496 | 8432 | 79 | 80 | 77 | 80 | 185 | 90 | 81 |
| 57 | MV-Massil | 8405 | 83 | 73 | 70 | 74 | 225 | 115 | 85 |
| 58 | MV-600-3 | 8239 | 90 | 96 | 69 | 73 | 230 | 135 | 94 |
| 59 | YH-5487 | 7953 | 88 | 85 | 77 | 80 | 165 | 85 | 102 |
| 60 | YH-5480 | 7934 | 81 | 83 | 78 | 81 | 150 | 75 | 83 |

It is evident from the results presented in the table that KSC-9617 out yielded all prominent commercial hybrids giving 13499 kg/ha, followed by the local hybrid YH-5411 (13400 kg/ha) MV-6002-2, MV-531 and Maxima seemed to be early maturing by taking 73 days to complete its fifty percent silks while local hybrid was late maturing taking 83 days to silks. Local hybrid FH-1292 showed maximum plant height (240 cm) while YH-5510 showed minimum plant height (160 cm).

### 5.5. National Uniform Maize Yield Trial Spring 2017

This trial was planted with 64 entries having plot size of 5mx.75m x2 with three replications. The data regarding various parameters are presented in the following Table 10.

**Table 10: Results of National Uniform Maize Yield Trial Spring 2017**

| E. No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| AS | SB-9663 | 12367 | 38 | 37 | 59 | 62 | 223 | 86 | 38 |
| AT | SB-9617 | 12045 | 36 | 37 | 63 | 66 | 203 | 74 | 36 |
| F | 77M86 | 10744 | 41 | 40 | 66 | 68 | 229 | 121 | 43 |
| AV | SB-9618 | 10506 | 37 | 37 | 58 | 62 | 213 | 101 | 38 |
| AF | NK-7113 | 10422 | 37 | 40 | 57 | 60 | 248 | 98 | 39 |
| BJ | 8109 | 10361 | 40 | 41 | 63 | 65 | 195 | 69 | 41 |
| G | KEGROS | 10194 | 40 | 39 | 58 | 61 | 247 | 99 | 42 |
| K | TG-758 | 9506 | 36 | 36 | 58 | 61 | 210 | 86 | 39 |
| AD | FH-988 | 9428 | 38 | 39 | 64 | 67 | 238 | 158 | 39 |
| A | 2867 | 9400 | 37 | 38 | 63 | 66 | 205 | 97 | 37 |
| B | CS-5808 | 9289 | 39 | 38 | 55 | 58 | 212 | 94 | 41 |
| Z | TMZ-1 | 9289 | 37 | 38 | 64 | 66 | 220 | 105 | 38 |
| E | 70M70 | 9006 | 39 | 38 | 66 | 69 | 224 | 118 | 42 |
| AE | FH-1292 | 8939 | 38 | 36 | 63 | 66 | 222 | 114 | 41 |
| AH | NK-7953 | 8845 | 38 | 39 | 55 | 58 | 216 | 84 | 39 |
| AO | AAS-9435 | 8822 | 33 | 37 | 66 | 68 | 167 | 96 | 35 |
| AG | NK-7213 | 8761 | 33 | 35 | 57 | 60 | 215 | 89 | 34 |
| AC | FH-793 | 8733 | 38 | 38 | 64 | 67 | 185 | 102 | 39 |
| I | KOLLEOS | 8722 | 35 | 37 | 57 | 60 | 230 | 99 | 38 |
| AJ | S-6624 | 8656 | 35 | 37 | 59 | 62 | 209 | 62 | 37 |
| AU | SB-5971 | 8650 | 35 | 35 | 64 | 67 | 205 | 106 | 38 |
| AQ | W 440 C | 8633 | 36 | 36 | 58 | 61 | 198 | 71 | 42 |
| AA | TMZ-2 | 8578 | 37 | 38 | 57 | 59 | 212 | 86 | 39 |
| M | TG-1701 | 8550 | 39 | 38 | 57 | 60 | 225 | 92 | 39 |
| BA | 33S70 | 8544 | 31 | 34 | 59 | 62 | 183 | 63 | 37 |
| AB | 5190 | 8500 | 37 | 35 | 57 | 60 | 202 | 71 | 38 |
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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| BI | MDS-555 | 8472 | 35 | 36 | 61 | 64 | 188 | 85 | 41 |
| AR | W 220 C | 8333 | 39 | 38 | 58 | 62 | 210 | 83 | 40 |
| Y | ZS-9091 | 8333 | 32 | 39 | 59 | 61 | 228 | 84 | 33 |
| D | HC-9944 | 8233 | 42 | 41 | 59 | 62 | 205 | 96 | 46 |
| AY | 25S32 | 8228 | 32 | 35 | 62 | 65 | 222 | 77 | 33 |
| AM | C-8314 | 8183 | 36 | 36 | 63 | 66 | 175 | 102 | 41 |
| BL | YH1898 (c) | 8183 | 36 | 35 | 58 | 61 | 194 | 63 | 39 |
| AI | NK-6503 | 8167 | 34 | 38 | 65 | 67 | 210 | 85 | 36 |
| BC | 9086 | 8100 | 33 | 35 | 58 | 61 | 200 | 98 | 37 |
| AP | P-2088 | 8061 | 34 | 36 | 57 | 60 | 179 | 92 | 42 |
| H | KONTGOS | 8011 | 36 | 35 | 59 | 62 | 226 | 97 | 36 |
| BE | 9033 | 8005 | 34 | 35 | 57 | 61 | 183 | 61 | 35 |
| AK | GW-3363 | 7789 | 32 | 34 | 58 | 62 | 222 | 68 | 34 |
| C | HC-9933 | 7717 | 37 | 36 | 61 | 64 | 225 | 105 | 38 |
| L | TG-768 | 7611 | 37 | 38 | 56 | 59 | 223 | 92 | 39 |
| BB | 33S66 | 7605 | 32 | 32 | 61 | 63 | 210 | 76 | 35 |
| O | NARC-2 | 7595 | 26 | 30 | 64 | 66 | 202 | 95 | 27 |
| W | AS-001 | 7572 | 31 | 35 | 58 | 61 | 208 | 97 | 34 |
| J | TG-748 | 7528 | 35 | 35 | 57 | 60 | 212 | 94 | 36 |
| V | WS-181 | 7522 | 32 | 34 | 58 | 60 | 188 | 72 | 34 |
| X | SAMURAY | 7428 | 38 | 38 | 59 | 62 | 220 | 92 | 41 |
| R | BODEGA | 7389 | 37 | 37 | 56 | 59 | 190 | 62 | 42 |
| AL | GW-3436 | 7361 | 35 | 36 | 64 | 67 | 177 | 64 | 38 |
| T | MV-531 | 7161 | 38 | 40 | 57 | 61 | 204 | 72 | 39 |
| AZ | S3575 | 7100 | 38 | 35 | 56 | 58 | 222 | 83 | 41 |
| AN | FSD Maize-2018 | 7061 | 38 | 39 | 65 | 68 | 202 | 97 | 39 |
| BD | 9082 | 6744 | 34 | 35 | 56 | 60 | 182 | 72 | 42 |
| BK | NEELUM 22AR16 | 6711 | 34 | 35 | 64 | 67 | 218 | 72 | 35 |
| BF | 9034 | 6628 | 38 | 39 | 64 | 66 | 166 | 64 | 41 |
| N | NARC-1 | 6139 | 35 | 36 | 64 | 66 | 183 | 102 | 36 |
| Q | MAS72A | 6061 | 31 | 33 | 62 | 65 | 191 | 82 | 37 |
| BG | MDS-111 | 5922 | 39 | 39 | 60 | 63 | 135 | 74 | 41 |
| U | MAXIMA | 5850 | 35 | 38 | 60 | 64 | 194 | 98 | 37 |
| P | MAS47P | 5834 | 30 | 30 | 56 | 60 | 187 | 73 | 32 |
| AX | MAS-39WX | 5522 | 33 | 36 | 56 | 58 | 187 | 76 | 36 |
| AW | MAS-56WS | 5506 | 33 | 35 | 57 | 61 | 216 | 84 | 35 |
| S | CORESCO | 5400 | 37 | 35 | 57 | 60 | 208 | 85 | 39 |
| BH | MCS-333 | 4467 | 34 | 36 | 58 | 60 | 151 | 80 | 38 |
| CV% | | 13.7 | 7.0 | 5.1 | 1.8 | 1.7 | 4.5 | 8.4 | 9.5 |
| $Cd_1$ | | 1786 | 4.8 | 4.2 | 1.7 | 1.7 | 14.8 | 7.2 | 5.8 |

It is evident from the results presented in the table that entry SB-9663 out yielded all prominent commercial hybrids by giving 12367 kg/ha, entry CS-5808, NK-7953, MAS-39WX seemed to be early maturing by taking 58 days to complete its fifty percent silks while entry 70M70 was late maturing taking 69 days to silks. Entry NK-7113 showed maximum plant height (248 cm) while entry MCS-333 showed minimum plant height (151 cm). Entry 9033 showed low cob bearing (61 cm) while entry FH-988 showed high cob bearing (158 cm).
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# 6 HYBRID EVALUATION UNDER HIGH TEMPERATURE
## Replicated Yield Trials

## 6.1 Preliminary Maize Hybrid Yield Trial under High Temperature Spring 2017

This trial was comprised of twenty seven (27) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in RCBD with two replications on 22-3-2017 .Plot size was kept 4m x 075 m x1. The data regarding various parameters are presented in the following Table 11.

**Table 11: Results of Preliminary Maize Hybrid Yield Trial Spring 2017**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 7 | YH-5427 | 9054 | 17 | 17 | 58 | 61 | 173 | 103 | 18 |
| 24 | DK-6724 | 8997 | 18 | 17 | 56 | 59 | 173 | 88 | 19 |
| 1 | YH-5533 | 8615 | 18 | 16 | 56 | 59 | 183 | 90 | 18 |
| 23 | NK-8711 | 8367 | 18 | 19 | 56 | 59 | 178 | 88 | 20 |
| 17 | YH-5545 | 8255 | 17 | 17 | 59 | 62 | 200 | 110 | 17 |
| 19 | YH-5547 | 8229 | 17 | 17 | 58 | 61 | 178 | 103 | 17 |
| 13 | YH-5541 | 8187 | 17 | 17 | 63 | 66 | 180 | 103 | 18 |
| 25 | YH-1898 | 8090 | 19 | 18 | 60 | 63 | 183 | 95 | 20 |
| 3 | YH-5213 | 7995 | 16 | 16 | 58 | 61 | 168 | 78 | 18 |
| 5 | YH-5535 | 7780 | 17 | 17 | 57 | 60 | 153 | 70 | 18 |
| 22 | YH-5550 | 7729 | 18 | 18 | 59 | 62 | 190 | 108 | 20 |
| 15 | YH-5543 | 7448 | 18 | 18 | 58 | 61 | 168 | 93 | 19 |
| 20 | YH-5548 | 7225 | 16 | 17 | 58 | 61 | 185 | 98 | 18 |
| 16 | YH-5544 | 7153 | 20 | 20 | 59 | 62 | 180 | 98 | 21 |
| 2 | YH-5411 | 7108 | 17 | 16 | 61 | 64 | 175 | 93 | 18 |
| 9 | YH-5538 | 7020 | 17 | 17 | 61 | 64 | 163 | 90 | 17 |
| 8 | YH-5537 | 6990 | 16 | 17 | 59 | 62 | 165 | 100 | 17 |
| 27 | HC-9091 | 6940 | 19 | 19 | 56 | 59 | 185 | 93 | 22 |
| 21 | YH-5549 | 6815 | 17 | 16 | 60 | 63 | 183 | 103 | 18 |
| 26 | P-1543 | 6812 | 19 | 18 | 55 | 58 | 183 | 108 | 21 |
| 6 | YH-5536 | 6629 | 19 | 18 | 61 | 64 | 173 | 98 | 20 |
| 11 | YH-5539 | 6405 | 17 | 17 | 61 | 64 | 175 | 100 | 17 |
| 10 | YH-5140 | 6237 | 19 | 18 | 59 | 62 | 160 | 95 | 23 |
| 18 | YH-5546 | 5962 | 17 | 17 | 59 | 62 | 188 | 108 | 18 |
| 4 | YH-5534 | 5840 | 16 | 16 | 61 | 64 | 165 | 83 | 17 |
| 14 | YH-5542 | 5804 | 17 | 17 | 60 | 63 | 180 | 95 | 19 |
| 12 | YH-5540 | 5408 | 19 | 18 | 58 | 61 | 170 | 95 | 21 |
| CV% | | 18.5 | 9.1 | 6.5 | 1.9 | 1.7 | 6.4 | 11.3 | 12.3 |
| $Cd_1$ | | 2767.6 | 3.27 | 2.3 | 2.24 | 2.16 | 23.25 | 22.1 | 4.69 |

It is evident from the results presented in the table that YH-5427 out yielded all prominent commercial hybrids giving 9054 kg/ha, followed by the DK-6724 and a local
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hybrid YH-5533 giving 8997kg/ha and 8615kg/ha respectively. P-1543 seemed to be early maturing by taking 58 days to complete its fifty percent silks while local hybrid YH-5541 was late maturing taking 66 days to silks. Local hybrid YH-5545 showed maximum plant height (200 cm) while YH-5535 showed minimum plant height (153 cm).

### 6.2 Micro Plot Maize Hybrid Yield Trial under High Temperature Spring 2017

This trial was comprised of thirty two (32) entries including Standard hybrids of different maturity groups and ratios of temperate to tropical genetic material. The trial was sown in RCBD with two replications on 22-3-2017 .Plot size was kept 4m x 075 m x2. The data regarding various parameters are presented in the following Table 12.

**Table 12: Results of Micro Plot Maize Hybrid Yield Trial under High Temperature Spring 2017**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 29 | YH-5528 | 10733 | 36 | 35 | 59 | 62 | 173 | 98 | 36 |
| 8 | YH-5487 | 10611 | 35 | 36 | 60 | 63 | 183 | 95 | 37 |
| 21 | YH-5513 | 10432 | 37 | 37 | 59 | 62 | 170 | 93 | 37 |
| 5 | YH-5484 | 10387 | 36 | 36 | 59 | 62 | 170 | 93 | 37 |
| 15 | YH-5495 | 10091 | 36 | 35 | 58 | 61 | 190 | 100 | 36 |
| 22 | YH-5514 | 9087 | 36 | 36 | 61 | 64 | 173 | 85 | 36 |
| 12 | YH-5492 | 9085 | 37 | 37 | 59 | 62 | 195 | 115 | 39 |
| 4 | YH-5482 | 9029 | 37 | 36 | 58 | 62 | 170 | 90 | 39 |
| 10 | YH-5490 | 9008 | 35 | 36 | 59 | 62 | 193 | 98 | 37 |
| 24 | YH-5516 | 8724 | 37 | 36 | 62 | 65 | 178 | 85 | 36 |
| 7 | YH-5486 | 8602 | 35 | 35 | 62 | 65 | 193 | 108 | 37 |
| 9 | YH-5489 | 8183 | 37 | 37 | 59 | 62 | 188 | 93 | 38 |
| 6 | YH-5485 | 7899 | 36 | 35 | 62 | 65 | 188 | 103 | 37 |
| 18 | YH-5507 | 7819 | 35 | 34 | 63 | 66 | 180 | 95 | 36 |
| 26 | YH-5518 | 7787 | 36 | 35 | 63 | 66 | 195 | 93 | 37 |
| 30 | YH-5411 | 7664 | 35 | 35 | 60 | 63 | 158 | 90 | 36 |
| 17 | YH-5532 | 7502 | 33 | 34 | 63 | 66 | 160 | 83 | 35 |
| 28 | YH-5213 | 7383 | 36 | 36 | 59 | 62 | 178 | 108 | 37 |
| 23 | YH-5515 | 7363 | 35 | 35 | 63 | 66 | 173 | 90 | 36 |
| 11 | YH-5491 | 7359 | 35 | 35 | 61 | 64 | 180 | 90 | 36 |
| 25 | YH-5517 | 7304 | 37 | 36 | 62 | 65 | 173 | 85 | 37 |
| 27 | YH-5521 | 7033 | 36 | 36 | 61 | 64 | 178 | 95 | 37 |
| 13 | YH-5493 | 6958 | 36 | 36 | 58 | 61 | 185 | 98 | 37 |
| 32 | P-1543 | 6890 | 35 | 36 | 56 | 59 | 185 | 103 | 37 |
| 31 | YH-1898 (C) | 6587 | 35 | 35 | 62 | 65 | 178 | 105 | 35 |
| 20 | YH-5510 | 6020 | 34 | 35 | 62 | 65 | 183 | 90 | 37 |
| 1 | YH-5479 | 5912 | 36 | 36 | 63 | 61 | 173 | 93 | 36 |
| 2 | YH-5480 | 5554 | 36 | 36 | 59 | 63 | 155 | 88 | 36 |
| 19 | YH-5509 | 5551 | 34 | 34 | 61 | 63 | 160 | 80 | 34 |
| 3 | YH-5481 | 5130 | 36 | 37 | 59 | 62 | 173 | 105 | 38 |
| 14 | YH-5494 | 5049 | 35 | 36 | 62 | 65 | 185 | 93 | 36 |
| 16 | YH-5496 | 4402 | 35 | 35 | 61 | 64 | 168 | 85 | 35 |
| CV% | | 21.4 | 3.9 | 3.1 | 2.8 | 2.8 | 8.2 | 12.7 | 3.5 |
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|---|---|---|---|---|---|---|---|---|
| $Cd_1$ | 4329 | 2.8 | 2.2 | 3.5 | 3.6 | 29.8 | 24.4 | 2.6 |

It is evident from the results presented in the table that YH-5528 out yielded all prominent commercial hybrids giving 10733 kg/ha, followed by the YH-5487 giving 10611 kg/ha. YH-5495 seemed to be early maturing by taking 61 days to complete its fifty percent silks while local hybrid YH-5507 was late maturing taking 66 days to silks. Local hybrid YH-5518 showed maximum plant height (195 cm) while YH-5480 showed minimum plant height (155 cm).

### 6.3 Demonstration of Local Maize Hybrids In Comparison To Commercial Hybrids under High Temperature Spring 2017

This trial was comprised of sixty (30 local and 21 exotic hybrids). The trial was sown in non replicated strips on 22-3-2017. Plot size was kept 4m x 075 m x2. The data regarding various parameters are presented in the following Table 13.

**Table 13: Results of Demonstration of Local Maize Hybrids In Comparison To Commercial Hybrids under High Temperature Spring 2017**

| Entry No. | Hybrid code | Grain Yield Kg/ha | Plant Hrv. | Cob Hrv. | Days to tassel | Days to silk | Plant Ht. (cm) | Cob Ht. (cm) | Stand count |
|---|---|---|---|---|---|---|---|---|---|
| 1 | KSC-9617 | 10797 | 30 | 29 | 55 | 58 | 180 | 105 | 31 |
| 2 | YH-5515 | 10653 | 36 | 26 | 62 | 65 | 190 | 110 | 36 |
| 3 | FH-988 | 10035 | 35 | 20 | 57 | 60 | 225 | 120 | 35 |
| 4 | YH-5507 | 10000 | 33 | 34 | 56 | 59 | 215 | 120 | 35 |
| 5 | YH-5427 | 9965 | 34 | 22 | 59 | 62 | 165 | 85 | 35 |
| 6 | YH-5536 | 9865 | 38 | 44 | 56 | 59 | 185 | 105 | 39 |
| 7 | YH-5535 | 9728 | 39 | 43 | 56 | 59 | 190 | 115 | 39 |
| 8 | DK-9108 | 9653 | 34 | 24 | 55 | 58 | 200 | 100 | 35 |
| 9 | YH-5519 | 9450 | 36 | 30 | 59 | 62 | 195 | 105 | 37 |
| 10 | FH-793 | 9370 | 35 | 37 | 56 | 59 | 200 | 115 | 36 |
| 11 | YH-1898 | 9343 | 40 | 40 | 59 | 62 | 170 | 110 | 40 |
| 12 | KSC-9633 | 9313 | 33 | 21 | 56 | 59 | 175 | 90 | 34 |
| 13 | YH-5482 | 9052 | 35 | 29 | 58 | 61 | 170 | 80 | 37 |
| 14 | YH-5491 | 8982 | 34 | 28 | 59 | 62 | 190 | 90 | 35 |
| 15 | R-360 | 8775 | 40 | 45 | 56 | 59 | 205 | 95 | 40 |
| 16 | YH-5521 | 8600 | 35 | 30 | 59 | 62 | 185 | 100 | 36 |
| 17 | YH-5487 | 8462 | 32 | 28 | 58 | 61 | 190 | 105 | 34 |
| 18 | YH-5533 | 8420 | 32 | 33 | 55 | 58 | 195 | 100 | 33 |
| 19 | NK-8711 | 8403 | 30 | 28 | 55 | 58 | 175 | 85 | 33 |
| 20 | YH-5516 | 8400 | 35 | 30 | 54 | 57 | 165 | 80 | 38 |
| 21 | YH-5213 | 8373 | 36 | 32 | 55 | 58 | 180 | 100 | 36 |
| 22 | YH-5550 | 8373 | 34 | 27 | 56 | 59 | 185 | 80 | 35 |
| 23 | YH-5518 | 8280 | 35 | 29 | 59 | 62 | 180 | 80 | 35 |
| 24 | KSC-9618 | 8218 | 33 | 32 | 55 | 58 | 180 | 80 | 34 |
| 25 | YH-5213 | 8162 | 36 | 37 | 56 | 59 | 205 | 125 | 36 |
| 26 | YH-5411 | 8043 | 34 | 26 | 56 | 59 | 180 | 100 | 36 |
| 27 | FH-949 | 8018 | 33 | 36 | 58 | 61 | 205 | 125 | 35 |
| 28 | FH-1292 | 8005 | 36 | 26 | 58 | 61 | 200 | 120 | 36 |
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|---|---|---|---|---|---|---|---|---|---|
| 29 | YH-5486 | 7943 | 34 | 29 | 63 | 66 | 200 | 90 | 36 |
| 30 | YH-5509 | 7905 | 37 | 25 | 58 | 61 | 180 | 95 | 37 |
| 31 | YH-1899 | 7688 | 38 | 38 | 59 | 62 | 185 | 115 | 39 |
| 32 | YH-5485 | 7633 | 35 | 26 | 59 | 62 | 180 | 80 | 37 |
| 33 | YH-5542 | 7595 | 34 | 29 | 56 | 59 | 180 | 105 | 37 |
| 34 | 26240 | 7490 | 35 | 31 | 55 | 58 | 180 | 95 | 37 |
| 35 | P-1543 | 7420 | 31 | 33 | 57 | 60 | 180 | 80 | 33 |
| 36 | YH-5514 | 7392 | 34 | 23 | 60 | 63 | 185 | 85 | 35 |
| 37 | YH-5140 | 7355 | 36 | 39 | 56 | 59 | 175 | 110 | 38 |
| 38 | KSC-5971 | 7297 | 31 | 31 | 56 | 59 | 200 | 100 | 32 |
| 39 | YH-5490 | 7232 | 33 | 32 | 56 | 59 | 175 | 95 | 33 |
| 40 | YH-5517 | 7217 | 35 | 28 | 59 | 62 | 195 | 95 | 36 |
| 41 | HC-9091 | 7127 | 33 | 33 | 54 | 57 | 190 | 100 | 34 |
| 42 | YH-5492 | 7072 | 36 | 22 | 58 | 61 | 200 | 90 | 36 |
| 43 | MV-600-3 | 6930 | 35 | 39 | 55 | 58 | 190 | 90 | 37 |
| 44 | YH-5534 | 6873 | 34 | 29 | 56 | 59 | 165 | 95 | 35 |
| 45 | HC-2040 | 6748 | 34 | 27 | 54 | 58 | 190 | 90 | 35 |
| 46 | YH-5529 | 6637 | 35 | 13 | 56 | 59 | 170 | 80 | 35 |
| 47 | YH-5545 | 6430 | 35 | 37 | 55 | 58 | 210 | 120 | 38 |
| 48 | CZP-13002 | 6327 | 32 | 34 | 56 | 59 | 195 | 115 | 34 |
| 49 | YH-5493 | 6072 | 35 | 34 | 55 | 58 | 195 | 105 | 36 |
| 50 | YH-5496 | 6048 | 35 | 25 | 59 | 62 | 185 | 95 | 37 |
| 51 | YH-5480 | 5995 | 35 | 35 | 62 | 65 | 175 | 85 | 36 |
| 52 | MV-633 | 5978 | 38 | 41 | 54 | 57 | 175 | 85 | 39 |
| 53 | SHG-43 | 5807 | 35 | 24 | 53 | 56 | 155 | 75 | 35 |
| 54 | MV-531 | 5693 | 35 | 36 | 53 | 56 | 180 | 65 | 37 |
| 55 | DK-6724 | 5638 | 31 | 30 | 54 | 58 | 180 | 85 | 31 |
| 56 | MV-600-4 | 5365 | 39 | 40 | 54 | 57 | 165 | 80 | 39 |
| 57 | MV-600-2 | 5095 | 33 | 32 | 53 | 56 | 170 | 85 | 34 |
| 58 | YH-5494 | 4795 | 33 | 33 | 63 | 67 | 215 | 120 | 35 |
| 59 | MV-Massil | 4547 | 34 | 33 | 57 | 60 | 205 | 80 | 35 |
| 60 | Maxima | 4287 | 29 | 28 | 53 | 56 | 185 | 100 | 33 |

It is evident from the results presented in the table that KSC-9617 out yielded all prominent commercial hybrids giving 10797 kg/ha, followed by the YH-5515 giving 10653 kg/ha. SHG-43& MV-531 seemed to be early maturing by taking 56 days to complete its fifty percent silks while local hybrid YH-5494 was late maturing taking 67 days to silks. Local hybrid YH-5534 showed minimum plant height (165 cm) while FH-988 showed maximum plant height (225 cm)

**HYBRID MAIZE (WHITE)**

**KHARIF 2016**

**1. Derivation of Inbred Families during Kharif 2016**

During Kharif 2016, 125 derivative lines in different generations ($S_0$ =6, $S_1$ =17, $S_2$ =19, $S_3$ =12, $S_4$ =6, $S_5$ =15, $S_6$ =24, $S_7$ =16 & $S_8$ =10) were sown for derivation of inbred lines. All undesirable plants in each family were rouged out and 3-6 similar/ desirable plants were selected in each family before tasseling and silking. Tassels and silks were covered
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with kraft paper bags and plastic bags respectively for self-pollination. Self-pollination was accomplished by hand. At maturity, selfed plants were harvested in each family, separately, and seed of 143 inbreeding families was collected for further derivation and selection cycles.

**2. Maintenance of Inbred Lines during Kharif 2016**

During Kharif 2016, 15 inbred lines were sown in ear to row fashion for maintenance by hand pollination. Any plant showing deviation from characters of inbred line was removed to maintain the purity of inbred line. Tassels and silks were covered with kraft paper bags and plastic bags respectively for self-pollination. Self-pollination was accomplished by hand. At maturity, selfed plants were harvested in each family, separately.

## SPRING 2017

**3. Derivation of Inbred Families during Spring 2017**

During spring 2017, 143 families of different generations i.e. $S_0$ =11, $S_1$ =13, $S_2$ =18, $S_3$ =28, $S_4$=14, $S_5$ = 15, $S_6$ =22 & $S_7$ =22 were sown for derivation of inbred lines. 3-6 similar / desirable plants in each family were selected and remaining off-type plants were removed before tassels emergence. Tassels and silks were covered with Kraft paper bags and plastic bags respectively for self-pollination which was performed manually. At maturity, selfed plants were harvested in each family, separately, and seed of 200 families was collected for further inbreeding program.

**4. Maintenance of Inbred Lines during Spring 2017**

During spring 2016, 23 inbred lines were sown in ear to row fashion for maintenance by hand pollination. Any plant showing deviation from characters of particular inbred line was removed to maintain the purity of inbred line. Tassels and silks were covered with Kraft paper bags and plastic bags respectively for self-pollination. Self-pollination was accomplished by hand. At maturity, selfed plants were harvested in each family, separately

## OPV MAIZE:

## MAIZE (YELLOW)

### KHARIF 2016

**1. Improvement of Open Pollinated Variety YY-15**

Seed from previous year crop was sown in an isolation of 1 kanal during Kharif 2016. Open pollination was allowed. Selection was made on the basis of plant height, stem girth, cob length and cob placement at $8^{th}$ node with medium tassel. Cobs were collected from the selected plants and seed was kept for next sowing season after table selection.

**2. Improvement and Maintenance of Yusafwala Pool-50**

Seed received from spring 2016 was mixed and sown in isolation of 1 kanal during Kharif 2015. Open pollination was allowed and selection was made on the basis of plant height, stem girth, light tassel, cob length and lodging resistance. 200 cobs were selected. 100 cobs were kept for sowing in next season after table selection.
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### 3. Adaptability / National Uniform Maize Varietal Yield Trial, Kharif 2016

The trial comprising of 24 entries received from National Coordinator (Cereal System), Pakistan Agriculture Research Council with the instructions and data sheet. Data regarding different traits were recorded at different growth stages / physiological and analyzed statistically.

**Table 14: Means of Grain Yield (kg/ha) of Maize OPV Entries Evaluated in National Uniform Yield Trials conducted during Kharif-2016**

| Name of Varieties | MMRI (Yusafwala) | AARI (Faisalabad) | NARC (Islamabad) | Average (Kg/ha) |
|---|---|---|---|---|
| TP-1221 | 12133 | 6777 | 8859.3 | **9256.433** |
| **YW-786 (Check)** | 14356 | 5575.5 | 6951.3 | **8960.933** |
| NP-3 | 12089 | 5998.1 | 7566.3 | **8551.133** |
| TP-1217 | 12000 | 6539.2 | 5628.7 | **8055.967** |
| 13Pearl (Check) | 11822 | 5748.7 | 5753.7 | **7774.8** |
| **MMRI-Yellow (Check)** | 11067 | 5849.8 | 5647 | **7521.267** |
| CZP-132001 | 11378 | 5768.2 | 4723.7 | **7289.967** |
| **Local Swat Popcorn (Check)** | 10089 | 4853.9 | 5218.7 | **6720.533** |
| YY-15 | 8844 | 5381 | 5697 | **6640.667** |
| YPC-14 | 9778 | 5106.7 | 4477 | **6453.9** |
| CZP-13200 | 7333 | 4650.8 | 7351.3 | **6445.033** |
| **Local Swat Sweet Corn (Check)** | 7378 | 5786.4 | 5035 | **6066.467** |
| POP Corn 2016 | 9689 | 3236.1 | 4681.3 | **5868.8** |
| YSC-15 | 6533 | 4535.5 | 4530 | **5199.5** |
| Rakaposhi | 3689 | 3230.2 | 3584.3 | **3501.167** |
| NARC Sweet | 3422 | 2041 | 4722.7 | **3395.233** |
| **MEAN** | **9475** | **5067** | **5652** | |
| **C. V (%)** | **28.44** | **27.85** | **35.15** | |
| **LSD (0.05%)** | **4493** | **2353.6** | **NS** | |

The results revealed that entry TP-1221 stood first and YW-786 was second by giving grain yield 9256 and 8960 kg / ha respectively followed by NP-9 which showed 8055 kg / ha yield.

## SPRING 2017

### 1. Improvement of (OPV) YY-15

Seed received from selected cobs during Kharif-16 was sown in an isolation of 1.5 kanal during Spring-17. Open pollination was allowed. Best plants were selected and harvested on the basis of plant height, stem girth, cob length and cob placement at $8^{th}$ node. More over stem lodging was also noted. Best cobs from best plants were selected and seed was kept after table selection for next sowing season.

### 2. Improvement and Maintenance of Yusafwala Pool-50

Seed received from best selected cobs during Kharif-16 was sown in an isolation of 1.5 kanal during Spring-17. Population was allowed to open pollinate. Best plants were
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selected on the basis of plant height, stem girth, cob length, cob placement at 8th node and lodging resistance. Seed was collected from selected cobs and bulked for next season crop.

### 3. Adaptability / National Uniform Maize Varietal Yield Trial, Spring 2017

The trial comprising of 13 entries received from National Coordinator (Cereal System), Pakistan Agriculture Research Council with the instructions and data sheet. Data regarding different traits were recorded at different growth stages / physiological and analyzed statistically.

**Table 15: Means of Grain Yield (kg/ha) of Maize OPV Entries Evaluated in National Uniform Yield Trials conducted during Spring-2017**

| Sr.# | Code | Entry | MMRI | AARI | NARC | Mean |
|---|---|---|---|---|---|---|
| 1 | A | YY-15 | 10951 | 1644.2 | 6071.0 | 6222.1 |
| 2 | B | YW-786 | 9387 | 2144.4 | 5135.3 | 5555.6 |
| 3 | C | CPZ-132001 | 8213 | 1754.1 | 3123.7 | 4363.6 |
| 4 | D | NCEV-1530-13 | 5867 | 2227.7 | 5526.0 | 4540.2 |
| 5 | E | NCEV-9 | 6258 | 760 | 3118.7 | 3378.9 |
| 6 | F | NCEV-1530-5 | 5476 | 1259.4 | 5296.3 | 4010.6 |
| 7 | G | EV-7004-Q | 6649 | 1140.7 | 6529.3 | 4773.0 |
| 8 | H | SWC Local Swat | 4693 | 950.6 | 3167.3 | 2937.0 |
| 9 | I | NARC Sweet -16 | 5867 | 1921.7 | 2992.3 | 3593.7 |
| 10 | J | YPC-14 | 7040 | 1836.1 | 5616.0 | 4830.7 |
| 11 | K | Local Swat Pop Corn (Check) | 7040 | 1776.4 | 5432.3 | 4749.6 |
| 12 | L | MMRI yellow (Check) | 7431 | 918.1 | 5101.7 | 4483.6 |
| 13 | M | PEARL (Check) | 5867 | 2338.7 | 4535.3 | 4247.0 |
| | | **Mean** | **6979.9** | **1590.1** | **4741.9** | |
| | | **C. V.** | **23.3** | **64.8** | **44.3** | |
| | | **LSD** | **4865** | **NS** | **NS** | |

The results revealed that entry YY-15 stood first and YW-786 was second by giving grain yield 6222.1 and 5555.6 kg / ha respectively followed by CPZ-132001which showed 4363.6 kg / ha yields.

## WHITE Maize OPVs

### 1. Micro Plot Maize Yield Trial (OPVs) Kharif 2016

The trial comprising of nine entries was sown on 11-08-2016 in RCB design with three 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.
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**Table 16: Results of Micro Plot Maize Yield Trial (OPVs) Kharif, 2016**

| Rank No. | Entries | Grain Yield (Kg/ha) | Days to 50 % silk | Plant Height (cm) | Cob Height (cm) |
|---|---|---|---|---|---|
| 1 | YY-15 | 8393.2[a] | 48 | 220 | 121 |
| 2 | CZP-132001 | 7841.9[ab] | 54 | 227 | 119 |
| 3 | YW-786 | 7258[abc] | 53 | 233 | 126 |
| 4 | PEARL | 6788[bc] | 51 | 237 | 128 |
| 5 | YW-787 | 6574[bc] | 52 | 240 | 134 |
| 6 | MMRI Yellow | 6398[c] | 53 | 226 | 120 |
| 7 | PAK-I | 4433[d] | 50 | 186 | 89 |
| 8 | Agaiti-2002 | 4237[d] | 45 | 170 | 78 |
| 9 | PAK-II | 3748[d] | 53 | 167 | 86 |
| CV % | | 12 | 2 | 5 | 7 |
| LSD (0.05) | | 1364 | 1 | 19 | 14 |

The results (Table 16) revealed that promising line YY-15 stood 1st position by giving grain yield of 8393 kg/ha followed by YW-786 with grain yield of 7841 kg/ha while PAK-II gave the minimum grain yield of 3748 kg/ha. YW-787 attained the maximum plant height of 240 cm whereas Pak-II attained the minimum plant height of 167 cm. Agaiti-2002 showed low level bearing with 78 cm cob height while YW-787 showed the highest bearing of 134 cm.

**2. Micro Plot Maize Yield Trial (OPVs) Spring, 2017**

The trial comprising of eight entries was sown on 09-02-2017 in RCB design with three repeats. 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 17: Results of Micro Plot Maize Yield Trial (OPVs) Spring, 2017**

| Rank No. | Entries | Grain Yield (Kg/ha) | Days to 50 % silk | Plant ht. (cm) | Cob ht. (cm) |
|---|---|---|---|---|---|
| 1 | YY-15 | 9953.7a | 79 | 228.3 | 131 |
| 2 | Pak-I | 9578.1a | 79.3 | 238.7 | 131.2 |
| 3 | Pearl | 9202.1a | 79 | 221.7 | 109.5 |
| 4 | YW-787 | 8937.4a | 78.7 | 243.7 | 132.8 |
| 5 | MMRI Yellow | 8717.3a | 75.7 | 182.7 | 82.5 |
| 6 | YW-786 | 7997.5ab | 78.3 | 214.3 | 114.3 |
| 7 | CZP-132001 | 7739.1ab | 75 | 223 | 125.5 |
| 8 | Pak-II | 6077.2b | 78.7 | 194.7 | 93.8 |
| CV % | | 10.1 | 0.93 | 6.6 | 9.6 |

The results (Table 17) revealed that promising line YY-15 ranked first with grain yield of 9953.7 kg/ha and PAK-I was at 2nd position (9578 kg/ha) whereas minimum grain
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yield (6077 kg/ha) was given by PAK-II.YW-787 attained the maximum plant height of 243 cm whereas MMRI yellow attained the minimum plant height of 182 cm. MMRI Yellow showed low level bearing with 82.5 cm cob height while YW-787 showed the highest bearing of 132.8 cm.

## POPCORN AND SWEET CORN

### 1. Micro Plot Maize Yield Trial (Pop & Sweet Corn) Kharif, 2016

The trial comprising of five entries (Pop & Sweet Corn) was sown on 16-08-2016 in RCB design with three replications. Data regarding different traits were recorded at different growth stages / physiological maturity and analyzed statistically. Results are summarized below on mean basis.

**Table 18: Results of Micro Plot Maize Yield Trial (Pop & Sweet Corn) Kharif, 2016**

| Rank No. | Entries | Grain Yield (Kg/ha) | Days to 50 % silk | Plant Ht. (cm) | Cob Ht. (cm) |
|---|---|---|---|---|---|
| 1 | YPC-14 | 4664[a] | 54 | 223 | 129 |
| 2 | YSC-15 | 4603[a] | 49 | 199 | 106 |
| 3 | Sweet Corn (Swat) | 4130[ab] | 54 | 218 | 119 |
| 4 | YWPC-16 | 3645[bc] | 56 | 217 | 128 |
| 5 | Pop Corn (Swat) | 3046[c] | 55 | 224 | 129 |
| CV % | | 11 | 2 | 6 | 7 |
| LSD (0.05) | | 899 | 2 | 22 | 15 |

Result (Table 18) showed that maximum grain yields (4664 kg/ha) was produced by promising line YPC-14 followed by YSC-15 with grain yield of 4603 Kg/ha while minimum grain yield of 3046 kg/ha was recorded for Pop Corn (Swat).Pop Corn (Swat) got the maximum plant height of 224 cm whereas YSC-15 attained the minimum plant height of 199 cm. YSC-15 showed low level bearing by attaining 106 cm cob height while Pop Corn (Swat) and YPC-14 showed the highest bearing of 129 cm.

### 2. Micro Plot Maize Yield Trial (Pop & Sweet Corn) Spring, 2017

The trial comprising of five Pop Corn entries was sown on 04-02-2016 in RCB design with three replications. Data regarding different traits were recorded at different growth stages / physiological maturity and analyzed statistically. Results are summarized below on mean basis.

**Table 19: Results of Micro Plot Maize Yield Trial (Pop & Sweet Corn Spring, 2017**

| Rank No. | Entries | Grain Yield (Kg/ha) | Days to 50 % silk | Plant Height (cm) | Cob Height (cm) |
|---|---|---|---|---|---|
| 1 | SWEET CORN | 5845.2[a] | 77.7 | 221.3 | 125.3 |
| 2 | YPC-14 | 5471.8[ab] | 79 | 225 | 128.7 |
| 3 | POPCORN S | 5127.5[ab] | 80.7 | 228.3 | 117.7 |
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| | | | | | |
|---|---|---|---|---|---|
| 4 | WHITE POPC | 4951[b] | 80.3 | 231.7 | 119 |
| 5 | YSC-15 | 4910.8[b] | 73.3 | 242 | 144.3 |
| CV % | | 5.96 | 0.68 | 2.02 | 6.17 |
| LSD (0.05) | | 883.4 | 1.5 | 13 | 22 |

The result (Table 19) revealed that promising line Sweet Corn (Swat) was at top with grain yield of 5845 kg/ha followed by YPC-14 with grain yield of 5471 kg/ha while YSC-15 gave the minimum grain yield of 4910 kg/ha.YSC-15 got the maximum plant height of 242 cm whereas Sweet Corn attained the minimum plant height of 221 cm. Pop Corn (Swat) showed low level bearing by attaining 119 cm cob height while YSC-15 showed the highest bearing of 144 cm.

# SORGHUM

# KHARIF 2016

## 1. MAINTENANCE OF BREEDING MATERIAL.

### i. Gene Pool

Eighty sorghum collections having diversified characteristics were planted 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. All the selected / covered plants were harvested for further maintenance.

### ii. Cytoplasmic Male Sterile (A) Lines.

Fourteen 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. All lines were maintained while two lines were split into two due to difference in maturity period. Panicles of ten plants from each A and B line were covered before anthesis for the production of pure seed of lines. All the "A" lines were maintained with their counterpart "B" lines.

### iii. Fertility Restorer Lines

Twenty six fertility 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 program.

## 2. BREEDING

### i. Hybrids Constitution: (CMS × Restorers)

Twenty Eight (CMS x R) crosses were constituted (24 in isolation and 4 by hand) during Kharif 2016 for their evaluation to identify the best commercial hybrid. The panicles of CMS lines and restorers were covered with kraft 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 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.
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**ii. Filial Generations:**

Eight $F_2$ families were planted in Kharif 2016 and 20 generations were harvested for next filial generation. Five $F_4$ families were planted and phenotypically superior plants from four families were selected and 7 generations were harvested for raising their next filial generation.

**Head to Row Families:**

Head to row selection blocks were sown for maintenance, purification and improvement of approved / promising varieties. True to type plants were selected from uniform and disease free rows. The number of heads selected from each variety is given below in Table 20:

**Table 20: Number of Heads of Each Variety**

| Sr. No. | Variety | No. of Selected Heads | Status |
|---|---|---|---|
| 1 | YSS-98 | 84 | Approved |
| 2 | YS-16 | 306 | Approved |

**EVALUATION**

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

**i. Sorghum Hybrid Yield Trial, Kharif 2016.**

Ten (CMS x R) hybrids were tested including three checks YSS-98, YS-16 and Lasani (Private company hybrid). 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 Table 21.

**Table 21: Results of Sorghum Hybrid Yield Trial, Kharif 2016.**

| Sr. No. | Entry | Plant Stand | Brix Value | Grain Yield (Kg/ha) | Stalk Yield (Kg/ha) | Flag Leaf Area ($Cm^2$) | Days to 50% Anth. | Plant ht. (cm.) |
|---|---|---|---|---|---|---|---|---|
| 1 | YSH-95 | 39 | 15.80 | 4278a | 39445 | 305 | 80 | 231 |
| 2 | YSH-61 | 38 | 7.87 | 3692a | 50556 | 340 | 83 | 236 |
| 3 | YSS-98 (C) | 35 | 16.37 | 3575a | 40000 | 300 | 81 | 235 |
| 4 | YS-16 (C) | 37 | 12.10 | 2725b | 38889 | 379 | 83 | 264 |
| 5 | Lasani (C) | 31 | 7.70 | 2364bc | 34445 | 250 | 81 | 218 |
| 6 | YSH-120 | 39 | 17.0 | 2333bc | 42220 | 234 | 73 | 270 |
| 7 | YSH-118 | 35 | 8.60 | 1928bc | 47222 | 264 | 78 | 227 |
| 8 | YSH-122-7 | 37 | 18.67 | 1811c | 41667 | 192 | 75 | 268 |
| 9 | YSH-121 | 37 | 13.60 | 950d | 32222 | 215 | 69 | 162 |
| 10 | YSH-75 | 35 | 18.70 | 897d | 31111 | 189 | 93 | 214 |
| | Range | 31-39 | 7.70-18.70 | 897-4278 | 31111-50556 | 189-379 | 69-93 | 162-270 |
| | C.V.% | 11.45 | 1.54 | 19.27 | 15.44 | 21.21 | 3.70 | 3.64 |
| | LSD @ 5% | NS | 0.36 | 811.47 | 10536 | 97.01 | 5.06 | 14.51 |
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It is evident from the above Table 21 that hybrid YSH-95 exhibited the highest grain yield of 4278 kg/ha followed by YSH-61 (3692 Kg/ha). Maximum stalk yield of 50556 kg/ha was produced by YSH-61 followed by YSH-118 (47222 Kg/ha). Plant height ranged from 162 to 270 cm and days to 50% anthesis from 69 to 93. YSH-95 was selected for NUYT and DUS in next season.

**Sorghum Varietal Yield Trial, Kharif 2016**

Eight 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 below in Table 22.

**Table 22: Results of Sorghum Varietal Yield Trial, Kharif 2016**

| Sr. No. | Entry | Plant Stand | Brix Value | Grain Yield (Kg/ha) | Stalk Yield (Kg/ha) | Flag Leaf Area ($Cm^2$) | Days to 50% Anth. | Plant ht. (cm.) |
|---|---|---|---|---|---|---|---|---|
| 1 | YSS-10 | 32 | 8.83 | 3767a | 36111 | 175 | 84 | 232 |
| 3 | YSS-98 (C) | 33 | 16.33 | 3620ab | 31667 | 174 | 81 | 203 |
| 2 | YSS-18 | 34 | 8.47 | 3598ab | 28333 | 319 | 82 | 245 |
| 4 | YS-16 (C) | 38 | 12.47 | 2792abc | 38889 | 270 | 81 | 257 |
| 5 | YSS-25 | 36 | Non-Juicy | 2675bc | 26111 | 308 | 86 | 232 |
| 7 | YSS-19 | 40 | 12.63 | 2656bc | 22778 | 219 | 81 | 129 |
| 8 | YSS-23 | 36 | Non-Juicy | 2495c | 46667 | 277 | 89 | 378 |
| 6 | YSS-31 | 39 | 11.70 | 2353c | 35000 | 276 | 80 | 209 |
| | Range | 32-40 | 0-16.33 | 2353-3767 | 22778-46667 | 174-319 | 80-89 | 129-378 |
| C.V.% | | 11.95 | 23.63 | 18.69 | 9714.2 | 23.18 | 4.10 | 4.94 |
| LSD @ 5% | | NS | 3.64 | 979.93 | 16.71 | 102.33 | 5.96 | 20.36 |

Statistical analysis of the data revealed that the Entry YSS-10 out yielded all other entries included in the trial by giving grain yield 3767 kg/ha followed by check YSS-98 (3620 Kg/ha) and YSS-18 (3598 Kg/ha). Maximum stalk yield of 46667 kg/ha was produced by YSS-23 followed by YS-16 (38889 Kg/ha) and YSS-10 (36111 Kg/ha). Plant height ranged from 129 cm to 378 cm and days to 50% anthesis from 80 to 89.

**National Uniform Yield Trial**

Four varieties/hybrids were evaluated 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 other important plant characteristics were recorded and presented below in Table 23.

**Table 23: National Uniform Yield Trial, Kharif 2016**

| Sr. No. | Entry | Stand Count | Grain Yield (Kg/ha) | Stalk Yield (Kg/ha) | Days to 50% Anth. | Days to Maturity | Plant Height (cm) |
|---|---|---|---|---|---|---|---|
| 1 | YSH-95 | 23 | 2319a | 22222 | 76.00 | 139 | 218 |
| 2 | YS-16 | 23 | 1986a | 27778 | 77.33 | 139 | 241 |
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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | W-3535 | 19 | 1813ab | 23333 | 78.67 | 134 | 133 |
| 4 | R-3636 | 18 | 406b | 19444 | 66.67 | 140 | 123 |
| | Range | 18-23 | 406-2319 | 19444-27778 | 66.67-76.00 | 134-140 | 123-241 |
| C.V.% | | 0.79 | 25.01 | 9.86 | 0.63 | 1.49 | 0.79 |
| LSD @ 5% | | 4.12 | NS | NS | 0.94 | 0.54 | 2.82 |

. The results revealed that YSH-95 gave highest yield (2319 Kg/ha) in comparison to Check YS-16 (1986 Kg/ha).

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

### 1. BREEDING:

### 1.1 Maintenance of Gene Pool:

Sixteen gene pool lines were planted on 14-07-2016. Each entry was sown in two row strips of 5 meter length. 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, sundried, threshed and seed stored for future use.

### 1.2 Maintenance of Cytoplasmic Male Sterile Lines:

Ten cytoplasmic male sterile (A) lines along with twenty one male fertile (B) lines in separate beds were planted on 14-07-2016 in two row strips of 5 meter length with row spacing 75 cm and plant spacing 20 cm. At the time of flowering three 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. Two 'A' lines were discarded due to high infestation of rust. After maturity the heads of each line were harvested separately, sundried and threshed. Reasonable seed was collected, which was stored after packing.

### 1.3 Maintenance of Fertility Restorer Lines:

Twenty nine fertility restorer lines were planted on 14-07-2016 in two row strips of 5 meter length with row spacing 75 and plant spacing 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. Four lines were discarded due to high infestation of rust. After maturity the self-pollinated heads of 25 lines were harvested separately, sundried and threshed. Reasonable seed was collected, which was stored.

### 1.4 Derivation of Fertility Restorer Lines:

Five $S_{10}$ and twenty seven $S_3$ fertility restorer derivative lines were sown in two row strips of 5 meter length for derivation on 14-07-2016. The row to row and plant to plant distances were 75 cm and 20 cm respectively. 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
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were harvested separately, sundried and threshed. Four derivative lines were added to fertility restorer lines. Reasonable seed was procured and stored after packing for future use.

### 1.5 Constitution of Pearl Millet Hybrids:

Fifteen crosses were made by crossing CMS lines with R-lines. Crossed heads were harvested separately and sundried, threshed and enough seed was stored after packing for evaluation in next season.

## 2. EVALUATION:

### 2.1 Pearl Millet Varietal Yield Trial:

The trial was comprised of ten varieties including check verity (18-BY). It was sown on 14-07-2016 in randomized complete block design with three replications. Plot size was kept 3m x 5m. Row to row and plant to plant distances were kept 75 cm and 20 cm respectively. Data were recorded for grain yield and various other agronomic traits some of which are presented in Table 24.

**Table 24: Results of Pearl Millet Varietal Yield Trial Kharif 2016**

| Sr. No. | Entries | Crop stand | Yield (kg/ha) | | 50% anthesis (days) | Plant Height (cm) | Heads Per plot |
|---|---|---|---|---|---|---|---|
| | | | Grain | Stalk | | | |
| 1 | YBS-95 | 36 | 2453 | 52222 | 63 | 302 | 73 |
| 2 | YBS-89 | 34 | 2386 | 46111 | 65 | 340 | 74 |
| 3 | YBS-98 | 35 | 2356 | 47222 | 63 | 323 | 69 |
| 4 | YBS-94 | 39 | 2333 | 43889 | 64 | 303 | 80 |
| 5 | YBS-92 | 33 | 2181 | 40000 | 60 | 313 | 71 |
| 6 | YBS-70 | 39 | 2133 | 55556 | 66 | 343 | 87 |
| 7 | YBS-93 | 37 | 1961 | 46111 | 65 | 323 | 82 |
| 8 | YBS-83 | 35 | 1800 | 48333 | 64 | 327 | 71 |
| 9 | 18-BY(C) | 35 | 1383 | 58889 | 66 | 355 | 68 |
| 10 | YBR-5 | 40 | 875 | 38333 | 58 | 305 | 93 |
| CV% | | 3.35 | 5.5 | 5.71 | 0.95 | 1.79 | 3.97 |
| $Cd_1$ | | 2.09 | 187 | 4672 | 1.03 | 9.92 | 5.24 |

The results given in Table 24 reveal that YBS-95 gained maximum grain yield of 2453 kg/ha followed by YBS-89, YBS-98 with grain yield of 2386 and 2356 kg/ha respectively, while 18-BY check variety got $9^{th}$ position with 1383 kg/ha. The variety YBR-5 stood at the bottom exhibiting 875 kg/ha. In case of stalk yield, variety 18-BY exhibited significantly the highest stalk yield of 58889 kg/ha fallowed by YBS-70 with stalk yield of 55556 kg/ha.

### 2.2 Adaptability/National Uniform Pearl Millet Yield Trial

The trial was comprised of seven entries was received from the National Coordinator of MSM, NARC, Islamabad. The trial was sown on 11-08-2016 in RCB design with three replications keeping plot size of 4 m x 1.5 m. The row to row and plant to plant distances were 75 cm and 20 cm respectively. Data regarding grain yield, stalk yield, plant height and days to 50% anthesis were recorded which are presented in Table 25:
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**Table 25: Results of Adaptability/National Uniform Pearl Millet Yield Trial. Kharif 2016**

| Sr. No. | Entry | Crop stand | Yield (kg/ha) | | Plant height (cm) | Days to 50% anthesis | Days to maturity |
|---|---|---|---|---|---|---|---|
| 1 | 86M16 | 31 | 4033 | 41111 | 260 | 56 | 95 |
| 2 | 86M84 | 33 | 3783 | 38889 | 245 | 56 | 96 |
| 3 | 55S85 | 30 | 3367 | 34444 | 241 | 55 | 96 |
| 4 | 86M88 | 33 | 3291 | 33334 | 232 | 56 | 96 |
| 5 | YBS-89 | 27 | 2725 | 46111 | 308 | 56 | 95 |
| 6 | YBS-98 | 29 | 2433 | 30000 | 283 | 55 | 96 |
| 7 | YBS-95 | 30 | 2217 | 38889 | 276 | 55 | 95 |
| CV% | | 7.80 | 21.22 | 14.36 | 3.43 | 1.36 | 0.73 |
| LSD (0.05) | | NS | 1178 | NS | 16.12 | NS | NS |

The results presented in Table 25 indicate that 86M16 gave maximum grain yield of 4033 kg/ha followed by 86M84 (3783 kg/ha ) while YBS-95 produced the lowest grain yield of 2217 kg/ha. Entry No.6 produced maximum stalk yield of 46111 kg/ha. YBS-89 attained the maximum plant height of 308 cm.

# 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 as detailed below:

**Table 26: Seed Production of Maize OPVs**

| Sr. No. | Name of Crop Variety | BNS (kg) | Pre-basic (kg) | Basic (kg) | Certified (kg) |
|---|---|---|---|---|---|
| **Maize Kharif, 2016** | | | | | |
| 1 | Pearl | 3.0 | 2340 | 520 | - |
| 2 | YW-786 | 2.0 | - | - | - |
| 3 | YSC-15 | 3.5 | - | - | - |
| 4 | YPC-14 | 3.0 | - | - | - |
| **Maize Spring, 2017** | | | | | |
| 1 | Pearl | 2.0 | 3686 | 2670 | 3620 |
| 2 | YW-787 | 1.0 | - | - | - |
| 3 | YW-786 | 25 | - | - | - |
| 4 | YPC-14 | 2.0 | - | - | - |
| 5 | YSC-15 | 6.0 | - | - | |

**OPV Seed Production (Pre-basic MMRI Yellow)**

MMRI yellow which is an open pollinated variety was sown on an area of 10 Marla and 2 kanal during Kharif 2016 and spring 2017 respectively. 40 kg seed was harvested during Kharif 2016 while its produce during spring 2017 was 460 kg.
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**2. Hybrid Maize**

**i. Maintenance of Female Parental Line (Y-22 &Y-27)**

Female parental line Y-22 was planted in isolation on an area of 10 kanal and 2.5 acres during Kharif 2016 and spring 2017 respectively. Produce of Y-22 was 261 kg and 468 kg during Kharif 2016 and spring 2017 respectively. Male parental line Y-27 was sown on an area of 1.8 acres in both seasons and its produce was 569 kg and 1360 kg during Kharif 2016 and spring 2017 respectively.

**Hybrid Seed Production (YH-1898)**

Under hybrid seed production program, parental lines (Y-22 female and Y-27 male) of YH-1898 hybrid were sown on an area of 9 acres with 4:1 ratio in both seasons during kharif 2016 and spring 2017. Total produce of YH-1898 hybrid was 1517 kg during kharif 2016 and 4078 kg during spring 2017.

**3. Sorghum**

The following quantity of breeder & basic seed of approved and promising varieties (YSS-98 and YS-16) was produced (Table).

**Table 27: Seed Production of Sorghum Varieties**

| Variety | Quantity (Kg) | | |
|---|---|---|---|
| | Breeder | Pre-basic | Basic |
| YS-16 | 17 | 295 | 1210 |
| YSS-98 | 2.5 | 50 | 245 |

**4. Pearl Millet**

Following lines/varieties of Pearl Millet were sown during kharif 2016 in Isolation and procured seed of pre-basic category given against each.

**Table 28: Seed Production of Pearl Millet Varieties**

| Sr. No. | Variety/Line | Pre basic Seed produced (Kg) |
|---|---|---|
| 1 | 18 By | 208 |
| 2 | YBS-98 | 535 |
| 3 | YBS-95 | 170 |
| 4 | YBS-83 | 131 |
| 5 | YBS-70 | 71 |
| 6 | YBR-5 | 22 |

# AGRONOMY

**KHARIF 2016**

During Kharif 2016, different agronomic trials were planted and harvested after recording the data of different traits to develop the package of production technology for Maize, Sorghum and Pearl millet. The detail of each trial is as under:-

**1. Determination of Optimum Plant Population for Maize OPV (YY-15)**

This trial was planted on 17-08-16 using RCBD with four replications keeping plot size of 5m x 3m to determine gain yield of maize OPVYY-15 as affected by different plant populations. Data concerning crop stand, days to 50% silking, plant height, cob height and grain yield were recorded and presented as under.
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**Table 29: Determination of optimum plant spacing for maize OPV (YY-15)**

| Sr. No | Plant Densities/ha (R-R=75cm) | Actual Plants/Required Plants | Grain Yield (kg/ha) | Day to 50% Silking | Plant Height (cm) | Cob Height (cm) |
|---|---|---|---|---|---|---|
| 1 | 106666 (12.5cm) | 65/80 a | 7293 ab | 52 | 257 | 135 b |
| 2 | 88888 (15cm) | 54/66 b | 7783 a | 52 | 262 | 145 a |
| 3 | 76190 (17.5cm) | 47/56 c | 7056 bc | 53 | 252 | 131 b |
| 4 | 66666 (20cm) | 41/50 d | 6449 cd | 53 | 254 | 133 b |
| 5 | 59259 (22.5cm) | 39/44 d | 6238 d | 53 | 256 | 132 b |
| | CV% | 4.66 | 6.22 | 1.04 | 1.82 | 3.29 |
| | Cd1 | 3.53 | 667.75 | NS | N.S. | 6.87 |

The above-mentioned data showed that different plant population levels significantly affected the grain yield& cob height of maize OPVYY-15. Maximum grain yield of 7783 kg/ha was obtained with $T_2$ (88888 plants/ha) however it was statistically at par with $T_1$ (106666 plants/ha) which yielded 7293 kg/ha. Days to 50 % silking& plant height remained non-significant.

**2. Effect of Different Planting Methods on Grain Yield of Maize OPV YW-786.**

This trial was sown on 17-08-2016 according to RCB design with four replications keeping plot size 5m x 5.25m to evaluate the effect of different Planting methods on grain yield of maize OPV YW-786. Data regarding the plant stand, days to 50% silking, plant height, cob height and grain yield were recorded and analyzed statistically as presented in the following table:

**Table30: Effect of different planting methods on grain yield of maize OPV YW-786**

| Sr. No | Planting method | Actual Plants/Required Plants | Grain Yield (kg/h) | Days to 50% Silking | Plant Height (cm) | Cob Height (cm) |
|---|---|---|---|---|---|---|
| 1 | Ridge Sowing R-R (30″) sowing on one side (P-P = 8″) | 141/140 | 6364 a | 49 a | 233 c | 120 b |
| 2 | Bed Sowing B-B (36″) sowing on both side (P-P = 13″) | 140/140 | 5223 b | 48 ab | 240 b | 131 a |
| 3 | Bed Sowing B-B (42″) sowing on both side (P-P = 11.5″) | 143/140 | 5781 ab | 49 a | 242 b | 126 ab |
| 4 | Bed Sowing B-B (48″) sowing on both side (P-P = 9″) | 140/140 | 4913 b | 47 b | 249 a | 126 ab |
| | CV% | 1.82 | 10.70 | 3.82 | 5.21 | 5.21 |
| | $Cd_1$ | NS | 953.22 | 0.93 | 5.69 | 10.49 |

The results presented in the table showed that $T_1$ {Ridge Sowing R-R (30″) sowing on one side} produced significantly highest grain yield (6364 kg/ha) of maize OPVYW-786, which is statistically at par with $T_3$ {Bed Sowing B-B (42″) both side} by producing 5781 kg/ha. Whereas $T_4$ {Bed Sowing B-B (48″) both side produced minimum yield of 4913 kg/ha. Planting methods also effected days to 50 % silking, plant height and cob height significantly.
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### 3. Determination of Optimum Plant Population for Maize (Pop & Sweet Corn)

This trial was planted on 17-08-16 using Split Plot Design with three replications; keeping Varieties in main plots and Population levels in sub plots; having plot size 5m x 3m to determine grain yield of OPV's of Popcorn (YPC-14) and Sweet corn (YSC-15) as affected by different plant populations. Data concerning crop stand, days to 50% silking, plant height, cob height and grain yield were recorded and statistically analyzed. Yield data is given as under.

**Table 31: Determination of Optimum Plant Spacing for Maize OPV's (YPC-14 & YSC-15)**

| Sr. No | Plant Densities/ha (R-R=75cm) | Grain Yield (kg/ha) | | Average |
|---|---|---|---|---|
| | | YPC-14 | YSC-15 | |
| 1 | 106666 (12.5cm) | 6358.0a | 5710.0ab | 6334.2a |
| 2 | 88888 (15cm) | 5249.3bc | 5868.3ab | 5558.8ab |
| 3 | 76190(17.5) | 5131.0bc | 5046.7bc | 5088.8bc |
| 4 | 66666 (20cm) | 4964.7bc | 5032.0bc | 4998.3bc |
| 5 | 59259 (22.5cm) | 4511.0c | 4274.3c | 4392.7c |
| | **Average** | 5242.8 | 5186.3 NS | |
| | CV% (Varieties) | 11.66 | | |
| | Cd1 (Populations) | 744.06 | | |
| | Cd1 (Interaction) | 1052.3 | | |

The above-mentioned data showed that different plant population levels significantly affected the grain yield of maize OPV'sYPC-14 & YSC-15. Maximum grain yield of 6343.2 kg/ha was obtained with $T_1$ (106666 plants/ha) however it was statistically at par with $T_2$ (88888 plants/ha)which yielded 5558.8 kg/ha however, Varieties remained non-significant. The interaction (Varieties x population levels) was also significant.

### 4. Determination of Plant Population Levels for Grain Yield of New Pearl Millet Variety

This trial was planted on 27-07-2016, in RCB design, in four replications, keeping plot size 5m x 3m; to determine grain yield of YBS-95 as affected by different plant populations. The trial lodged near maturity due to rain and windstorm. Data regarding crop stand, days to 50% anthesis, plant height, number of tillers per plant, and grain yield were recorded which are presented in the following table.

**Table 32**: **Results of Plant Population Levels on Grain Yield of Pearl Millet Variety (YBS-95)**

| Sr. No | Plant Densities/ha (R-R=75 cm) | Stand Count | Grain Yield (Kg/ha) | Days to 50% Anthesis | Plant Height (cm) | No. of tillers / plant |
|---|---|---|---|---|---|---|
| 1 | 66666 (20 cm) | 47 a | 1442 | 58.25 a | 297a | 3.55 |
| 2 | 59276 (22.5 cm) | 42 b | 1985 | 58.00 ab | 289b | 4.10 |
| 3 | 53333 (25 cm) | 40 c | 2213 | 57.00 bc | 283 bc | 4.65 |
| 4 | 48496 (27.5 cm) | 36 d | 1940 | 57.00 bc | 281c | 4.25 |
| 5 | 44444 (30 cm) | 32 e | 1817 | 56.75 c | 272d | 4.05 |
| CV% | | 3.55 | 20.26 | 1.22 | 1.56 | 14.10 |
| Cd1 | | 2.16 | NS | 1.08 | 6.85 | NS |
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Statistical analysis of the data disclosed that different plant densities under study significantly affected days to 50% anthesis and plant height, while number of tillers per plant and grain yield remained non-significant of pearl millet variety YBS-95.

### 5. Determination of Optimum Plant Population Levels for Sorghum Hybrid

This trial was planted on 27-07-16 using RCBD with four replications keeping plot size of 5m x 3m to determine gain yield of sorghum hybrid YSH-95 as affected by different plant population levels. Data concerning crop stand, days to 50% anthesis, plant height and grain yield were recorded and presented as under.

**Table 33: Determination of optimum Plant Spacing for Sorghum Hybrid (YSH-95)**

| Sr. No | Plant Densities (R-R=75cm) | Actual /Required plants | Grain yield (kg/ha) | Day to 50% anthesis | Plant height (cm) |
|---|---|---|---|---|---|
| 1 | 106666 (12.5cm) | 72/80 a | 1937 b | 81 a | 219 c |
| 2 | 88888 (15 cm) | 59/66 b | 2467 a | 80 ab | 227 b |
| 3 | 76190 (17.5 cm) | 52/56 c | 2092 b | 81 a | 228 b |
| 4 | 66666 (20 cm) | 46/50 d | 2075 b | 80 ab | 233 a |
| 5 | 59276 (22.5 cm) | 41/44 e | 1957 b | 79 b | 234 a |
| | CV% | 4.39 | 7.28 | 1.12 | 1.36 |
| | Cd1 | 3.66 | 243.74 | 1.38 | 4.78 |

The above-mentioned data showed that plant population levels significantly affected the grain yield, days to 50 % anthesis and plant height of sorghum hybrid YSH-95. Maximum grain yield of 2467 kg/ha was obtained with $T_2$ (88888) plants /ha, in contrary $T_1$ (76190) yielded minimum (1937 kg/ha).

## SPRING 2017

During spring 2017, different agronomic trials were planted and harvested after recording the data of different traits to develop the package of production technology for Maize. The detail of each trial is as under:-

### Determination of Optimum Plant Population for Maize OPV (YY-15)

This trial was planted on 09-02-17 using RCBD with four replications keeping plot size of 4m x 3m to determine grain yield of maize OPVYY-15 as affected by different plant populations. Data concerning crop stand, days to 50% silking, plant height, cob height and grain yield were recorded and presented as under.

**Table 34: Determination of Optimum Plant Spacing for Maize OPV (YY-15).**

| Sr. No | Plant Densities/ha (R-R=75cm) | Actual Plants/Required Plants | Grain Yield (kg/ha) | Day to 50% Silking | Plant Height (cm) | Cob Height (cm) |
|---|---|---|---|---|---|---|
| 1 | 106666 (12.5cm) | 60/64 a | 8115 d | 69.25 | 237.50 | 136.25 b |
| 2 | 88888 (15cm) | 51/52 b | 8782 c | 69.25 | 247.25 | 142.25 ab |
| 3 | 76190 (17.5) | 44/45 c | 9217 b | 69.00 | 244.25 | 145.75 a |
| 4 | 66666 (20cm) | 39/40 d | 9929 a | 69.25 | 247.50 | 142.00 ab |
| 5 | 59259 (22.5cm) | 34/35e | 7416 e | 69.50 | 238.00 | 138.50 ab |
| | CV% | 2.19 | 2.52 | 1.14 | 4.22 | 3.38 |
| | Cd1 | 1.547 | 336.99 | NS | NS | 7.344 |
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The above-mentioned data showed that different plant population levels significantly affected the grain yield& cob height of maize OPVYY-15. Maximum grain yield of 9929 kg/ha was obtained with $T_4$ (66666 plants/ha), followed by $T_3$ (76190 plants/ha)which yielded 9217 kg/ha. Days to 50 % silking& plant height remained non-significant.

**1. Effect of Different Planting Methods on Grain Yield of Maize OPV YW-786.**

This trial was sown on 09-02-2017 according to RCB design with four replications keeping plot size 4m x 5.25m to evaluate the effect of different Planting methods on grain yield of maize OPV YW-786. Data regarding the plant stand, days to 50% silking, plant height, cob height and grain yield were recorded and analyzed statistically as presented in the following table:

**Table 35: Effect of Different Planting Methods on Grain Yield of Maize OPV YW-786**

| Sr. No | Planting Method | Actual Plants/Required Plants | Grain Yield (kg/h) | Days to 50% Silking | Plant Height (cm) | Cob Height (cm) |
|---|---|---|---|---|---|---|
| 1 | Ridge Sowing R-R (30″) sowing on one side (P-P = 8″) | 140/140 | 8613 a | 69.00 | 246.5 | 140.25 |
| 2 | Bed Sowing B-B (36″) sowing on both side (P-P = 13″) | 143/140 | 7762 b | 68.25 | 240.25 | 138.75 |
| 3 | Bed Sowing B-B (42″) sowing on both side (P-P = 11.5″) | 141/140 | 7887 b | 67.25 | 240.25 | 137.5 |
| 4 | Bed Sowing B-B (48″) sowing on both side (P-P = 9″) | 142/140 | 7093 c | 66.25 | 240.75 | 136.0 |
| CV% | | 0.71 | 2.65 | 1.60 | 4.13 | 4.60 |
| $Cd_1$ | | NS | 332.66 | 1.733 | NS | NS |

The results presented in the table showed that $T_1$ {Ridge Sowing R-R (30″) sowing on one side} produced significantly highest grain yield (8613 kg/ha) of maize OPVYW-786, followed by $T_3$ {Bed Sowing B-B (42″) both side} & $T_2$ {Bed Sowing B-B (36″) both side} by producing 7887 & 7762 kg/ha respectively. Whereas $T_4$ {Bed Sowing B-B (48″) both side} produced minimum yield of 7093 kg/ha. Planting methods also effected days to 50 % silking. Plant and cob height remained non-significant.

**2. Determination of Optimum Plant Population for Maize (Pop &Sweet Corn)**

This trial was planted on 09-02-2017 using Split Plot Design with three replications; keeping varieties in main plots and Population levels in sub plots; having plot size 5m x 3m to determine grain yield of OPV's of Popcorn (YPC-14) and Sweet corn (YSC-15) as affected by different plant populations. Data concerning crop stand, days to 50% silking, plant height, cob height and grain yield were recorded and statistically analyzed. Yield data is given as under.
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**Table 36: Determination of Optimum Plant Spacing for Maize OPV's (YPC-14 & YSC-15)**

| Sr. No | Plant Densities/ha (R-R=75cm) | Grain Yield (kg/ha) | | Average |
|---|---|---|---|---|
| | | YPC-14 | YSC-15 | |
| 1 | 106666 (12.5cm) | 4493 f | 5540 c | 5016 bc |
| 2 | 88888 (15cm) | 4874 de | 5647 c | 5261 b |
| 3 | 76190(17.5 cm) | 6088 ab | 5695 bc | 5891a |
| 4 | 66666 (20cm) | 6117 a | 5574 c | 5846 a |
| 5 | 59259 (22.5cm) | 5126 d | 4537 ef | 4831 c |
| | **Average** | 5340 NS | 5399 | |
| | CV% (Varieties) | 3.31 | | |
| | CV% (Population levels) | 3.92 | | |
| | Cd1 (Varieties) | NS | | |
| | Cd1 (Populations) | 257.72 | | |
| | Cd1 (Interaction) | 408.93 | | |

The above-mentioned data showed that different plant population levels significantly affected the grain yield of maize OPV'sYPC-14 & YSC-15. Maximum grain yield of 5891 kg/ha was obtained with $T_3$ (76190 plants/ha) however it was statistically at par with $T_4$ (66666 plants/ha) which yielded 5846 kg/ha. Varieties remained non-significant. The interaction (Varieties × population levels) was also significant.

# SOIL CHEMISTRY

**SPRING 2017**

**i. Impact of Different Fertilizer Levels on Grain Yield of New Maize Hybrid (YH-1898) Seed Production.**

This trial was laid out on 25-02-2016, in RCB design, with three replications, keeping plot size 5m x4m, to find out the most suitable level of NP fertilizer for getting maximum grain yield of Maize Hybrid i.e. YH-1898 for seed production. The results are given as under:

**Table 39: Results for Effect of Fertilizer Doses on Grain Yield of Maize Hybrid (YH-1898) Seed Production**

| Sr. No | Treatments (Kg/ha) | | | Grain Yield (Kg/ha) | Stand count | Days to 50% Siliking | Cob. Height (cm) | Plant Height (cm) N |
|---|---|---|---|---|---|---|---|---|
| | N | P | K | | | | | |
| 5 | 300 | 150 | 100 | 2325a | 51 | 63 | 50 | 84 |
| 6 | 325 | 162 | 100 | 2313a | 56 | 63 | 50 | 83 |
| 4 | 275 | 137 | 100 | 2266a | 57 | 61 | 52 | 88 |
| 3 | 250 | 125 | 100 | 2228a | 55 | 62 | 53 | 87 |
| 2 | 225 | 112 | 100 | 1883b | 60 | 62 | 53 | 91 |
| 1 | 0 | 0 | 0 | 1210c | 49 | 67 | 43 | 69 |
| CV% | | | | | | | | |
| LSD @ 5% | | | | | | | | |

Statistical analyses of the data presented in Table 39 revealed that different fertilizer doses under study significantly affected cob height, plant height, 50% days to silk and seed yield of Maize. Maximum days to 50% silking were found in treatment T-1 (67 days)
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conversely these were minimum in case of T-4 (61 days). T-2 & T-3 caused maximum cob height (53 cm) disparately T-1 turned out minimum cob height (43 cm). Maximum plant height was attained in T-2 (91 cm) whereas T-1 gave minimum plant height (69 cm). T-5 out yielded by producing 2325 kg/ha seed grains kg/ha, nonetheless statistically it was at par with T-6 (2313 kg/ha). T-1 gave minimum seed yield (1210 kg/ha).

# PLANT PATHOLOGY

## 1. Testing of Stalk Rot Intensity in Maize Varieties by Artificial Inoculation during Khrif-2016.

The trial comprised of five (5) maize varieties i.e. YY-15, YW-786, YPC-14, YSC-15 and CZP-132001. It was conducted according to RCBD with plot size 4mx2.25m in four replications it was sown on 11-08-2016. At silking stage, 5 plants /plot were inoculated with infected tooth picks. 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 revealed that maize varieties YY-15 YW-786, YPC-14, YSC-15 and CZP-132001 are moderately resistant against stalk rot.

**Testing of Stalk Rot Intensity in Maize Varieties by Artificial Inoculation during Spring-2017.**

The trial comprised of five (5) maize varieties i.e. YY-15, YW-786, YPC-14, YSC-15 and CZP-132001. It was conducted according to RCBD with plot size 4mx2.25m in four replications it was sown on 09-02-2017. At silking stage, 5 plants /plot were inoculated with infected tooth picks. 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 revealed that maize varieties YY-15 YW-786, YPC-14, YSC-15 and CZP-132001 are moderately resistant against stalk rot.

## 2. Testing Of Seed Dressing Fungicides against Seedling Blight in Maize During Spring-2017 (Hybrid=YH-1898).

The trial comprised of five (5) treatments i.e. Topsin-M 70 WP, Protocol 50 WP, Nanok 25 SC, Polyram DF70 and control. It was conducted according to RCBD with plot size 4mx2.25m in four replications. It was sown on 09-02-2017. Data regarding plant stand count, seedling blight attack %age, and grain yield were recorded which are presented in the Table 40.

**Table 40: Results of testing of seed dressing fungicides against seedling blight in maize.**

| Sr. # | Treatments | Plant Stand | Seedling blight %age | Grain Yield (Kg/ha) |
|---|---|---|---|---|
| 1 | Topsin-M 70 WP | 56 | 1.34 | 12172 |
| 2 | Protocol 50 WP | 57 | 1.75 | 11709 |
| 3 | Nanok 25 SC | 56 | 2.65 | 11114 |
| 4 | Polyram DF70 | 56 | 2.66 | 10689 |
| 5 | Control | 51 | 5.72 | 9867 |
| | C.V %age | 0.79 | 37.17 | 2.99 |
| | LSD @ 5 % | 0.68 | 1.61 | 511 |

The data revealed that Topsin-M 70WP gave the best control against seedling blight showing minimum seedling blight attack % age (1.34) with grain yield 12172 Kg/ha
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followed by Nanok 25 SC showing seedling blight attack % age (1.75) with grain yield 11709 Kg/ha.

ENTOMOLOGY

1. Testing of seed dressing insecticides against shoofly and maize borer during Kharif-2016 (Variety = MMRI Yellow)

The trial comprised of five (5) treatments i.e. Poncho Plus 600 FS, Confidor 70 WS, Actara 70 WS, Furadon 3G and control. It was conducted according to RCBD with plot size 4mx2.25m in four replications. It was sown on 11-08-2016. Data regarding plant stand count, shootfly infestation %age, maize borer infestation % age and grain yield were recorded which are presented in the Table 41.

Table 41: Results of testing of seed dressing insecticides against shoofly and maize borer.

Sr. #	Treatments	Plant Stand	Shoot fly infestation %age	Maize borer infestation %age	Grain Yield (Kg/ha)
1	Poncho Plus 600 FS	41	1.69	2.21	6061
2	Furadan 3G	38	2.88	2.34	5614
3	Confidor 70 WS	39	1.61	6.04	4731
4	Actara 70 WS	39	2.13	8.71	4409
5	Control	30	10.87	20.79	3345
C.V %age		7.45	30.04	55.08	9.51
LSD @ 5 %		2.6	1.77	6.8	708

The data revealed that Confidor 70 WS gave the best control against shoot fly showing minimum shoot fly infestation % age (1.61) Followed by Poncho Plus 600 FS showing shoot fly infestation % age (1.69) where as Poncho Plus 600 FS gave the best control against maize borer infestation % age (2.21) followed by Furadan 3G showing infestation % age (2.34). As far as the yield is concerned, Poncho Plus 600 FS gave the maximum yield (6061Kg/ha) followed by Furadan 3G which produced (5614 Kg/ha).

2. Testing of seed dressing insecticides against shoofly and maize borer during Spring-2017 (Hybrid=YH-1898).

The trial comprised of five (5) treatments i.e. Poncho Plus 600 FS, Confidor 70 WS, Actara 70 WS, Furadon 3G and control. It was conducted according to RCBD with plot size 4mx2.25m in four replications. It was sown on 09-02-2017. Data regarding plant stand count, shoot fly infestation %age, maize borer infestation % age and grain yield were recorded which are presented in the Table 42.

Table 42: Results of Testing of Seed Dressing Insecticides against Shoofly and Maize Borer.

Sr. #	Treatments	Plant Stand	Shoot fly infestation %age	Maize borer infestation %age	Grain Yield (Kg/ha)
1	Poncho Plus 600 FS	57	0.88	0.88	12375
2	Furadan 3G	55	0.89	1.34	11681

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| | | | | | |
|---|---|---|---|---|---|
| 3 | Confidor 70 WS | 57 | 1.75 | 1.32 | 11425 |
| 4 | Actara 70 WS | 56 | 0.00 | 2.66 | 11336 |
| 5 | Control | 57 | 14.91 | 6.14 | 9953 |
| | C.V %age | 1.87 | 144.20 | 45.62 | 3.18 |
| | LSD @ 5 % | 1.62 | 8.18 | 1.73 | 556 |

The data revealed that Actara 70 WS gave the best control against shoot fly showing minimum shoot fly infestation % age (0) followed by Poncho Plus 600 FS showing shoot fly infestation % age (0.88) where as Poncho Plus 600 FS gave the best control against maize borer showing maize borer infestation % age (0.88) followed by Furadan3G showing maize borer infestation % age (1.32). As far as the yield is concerned, Poncho Plus 600 FS produced the maximum yield (12375Kg/ha) followed by Confidor 70 WS which produced yield (11681 Kg/ha).

### 3. Testing of Different Spray able Insecticides against Shoot fly and Maize Borer during Spring- 2017 (Hybrid=YH-1898)

The trial comprised of five (5) treatments i.e. Tri super 40 EC, Trizone 40 EC, Lamcin 2.5 EC, Jatara 10 EC and control. It was conducted according to RCBD with plot size 4mx2.25m in four replications. It was sown on 09-02-2017. Data regarding plant stand count, shootfly infestation %age, maize borer infestation % age and grain yield were recorded which are presented in the Table 43

**Table 43: Results of different Spray able Insecticides against Shoofly and Maize Borer**

| Sr. # | Treatments | Plant Stand | Shoot fly infestation %age | Maize borer infestation %age | Grain Yield (Kg/ha) |
|---|---|---|---|---|---|
| 1 | Tri super 40 EC | 53 | 4.24 | 1.40 | 11845 |
| 2 | Trizone 40 EC | 52 | 4.29 | 1.42 | 11642 |
| 3 | Lamcin 2.5 EC | 53 | 4.69 | 2.34 | 11283 |
| 4 | Jatara 10 EC | 54 | 4.60 | 2.30 | 11033 |
| 5 | Control | 51 | 15.61 | 8.61 | 10256 |
| | C.V %age | 2.82 | 16.85 | 45.39 | 4.45 |
| | LSD @ 5 % | 2.28 | 1.73 | 2.24 | 768 |

The data revealed that Trizone 40 EC gave the best control against shoot fly showing minimum shoot fly infestation % age (4.24) followed by Tri super 40 EC showing shoot fly infestation % age (4.29) where as Trizone 40 EC also gave the best control against maize borer showing maize borer infestation % age (1.40) followed by Tri super 40 EC showing maize borer infestation % age (1.42). As far as the yield is concerned, Trizone 40 EC gave the maximum yield (11845 Kg/ha) followed by Tri super 40 EC which produced the yield (11642 Kg/ha).

### 4. Testing of Seed Dressing Insecticides against Shoofly during Spring-2017 (Hybrid=YH-1898).

The trial comprised of five (5) treatments i.e. Trunk 20 SC, Parlor 20 SC, Marine 20 SC, Confidor 70 WS and control. It was conducted according to RCBD with plot size 4mx2.25m in four replications. It was sown on 09-02-2017. Data regarding plant stand count, shootfly infestation %age, maize borer infestation % age and grain yield were recorded which are presented in the Table 44.
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**Table 44: Results of Testing of Seed dressing Insecticides against Shoofly.**

| Sr. # | Treatments | Plant Stand | Shoot fly infestation %age | Grain Yield (Kg/ha) |
|---|---|---|---|---|
| 1 | Trunk 20 SC | 55 | 0 | 12161 |
| 2 | Parlor 20 SC | 56 | 0 | 11881 |
| 3 | Marine 20 SC | 56 | 1.35 | 11367 |
| 4 | Confidor 70 WS | 54 | 1.38 | 11175 |
| 5 | Control | 56 | 9.36 | 9403 |
| | C.V %age | 3.36 | 135.12 | 3.53 |
| | LSD @ 5 % | 2.85 | 5.03 | 608 |

The data revealed that Trunk 20 SC and Parlor 20 SC gave the best control against shoot fly showing minimum shoot fly infestation % age (0,0) with grain yield 12161 Kg/ha and 11881 Kg/ha respectively followed by Marine 20 SC showing shoot fly infestation % age (1.35) with grain yield 11367Kg/ha.

**FARMER ADVISORY SERVICES:**

Seven (7) TV talks, Thirty Eight (38) radio talks were delivered to farmers about the maize, sorghum and pearl millet.

**FOREIGN COLLABORATIONS:**

Two projects of maize (Agriculture Innovation Program, AIP and Heat Tolerant Maize for South Asia, HTMA) are successfully going on. A scientist successfully completed two weeks training at regional office of CIMMYT, Nairobi, Kenya regarding doubled haploid technology of maize.

# STATIONS AND SUB-STATIONS

# MAIZE RESEARCH STATION, FAISALABAD

**SEASON AND ITS EFFECTS**:

During the year of 2016-17, 363.7 mm rainfall was received. High rainfall received in the month of July, 2016. Heavy smog during October & November, 2016 affected the crop yield slightly. The detail of average maximum and minimum temperature and rainfall received during July 2016 to June 2017 is as follows:

**Table 45: Metrological data of Maize Research Station, Faisalabad**

| Sr. No. | Month/Year | Average Temperature (c°) | | Rainfall (mm) |
|---|---|---|---|---|
| | | Maximum | Minimum | |
| 1 | July, 2016 | 37.3 | 26.9 | 154.5 |
| 2 | August, 2016 | 36.2 | 26.8 | 66.1 |
| 3 | September, 2016 | 37.1 | 25.2 | 5.8 |
| 4 | October, 2016 | 34.7 | 19.6 | 25 |
| 5 | November, 2016 | 28.7 | 11.9 | 0 |
| 6 | December, 2016 | 24.2 | 6.7 | 0 |
| 7 | January, 2017 | 18.4 | 6.8 | 11.9 |
| 8 | February, 2017 | 24.8 | 8.6 | 3.7 |
| 9 | March, 2017 | 28.8 | 13.8 | 16.1 |
| 10 | April, 2017 | 37.5 | 20.7 | 19.2 |
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|---|---|---|---|---|
| 11 | May 2017 | 40 | 24.6 | 5.4 |
| 12 | June, 2017 | 38.5 | 26.3 | 56.0 |

**RESEARCH WORK DONE**:

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

**Table 46: Gene pool maintained during the season**

| Sr. No | Entries | Planted | Harvested |
|---|---|---|---|
| 1 | Inbred lines | 249 | 240 |
| 2 | Inbreeding generations. | | |
| | $S_1$ | 23 | 21 |
| | $S_2$ | 50 | 43 |
| | $S_3$ | 54 | 36 |
| | $S_4$ | 24 | 10 |
| | $S_5$ | 29 | 20 |
| | $S_6$ | 38 | 28 |
| | $S_7$ | 39 | 29 |
| | **Total** | **200** | **186** |

**Crossing Block:**

Seventy five (75) single crosses were developed by hand pollination/ isolation blocks.

**YIELD TRIALS**

**Kharif 2016**

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

**1. Hybrid Maize Macro Yield Trials (Kharif 2016)**

**I. Hybrid Maize Macro Yield Trial No. 1: (Kharif 2016)**

This trial comprised of nine single cross hybrids including two commercial hybrids as check were sown on 19-08-2016. The trial was laid out in RCB design with three replications. The plot size was kept 5m x 3m. Standard agronomic and plant protection measures were carried out in the crop. The harvesting was done on 20-12-2016. Data regarding different agronomic traits were recorded and hybrids with good performance were selected for on farm testing. The data are given in Table 47.

**Table 47: Results of Hybrid Maize Macro Yield Trial-1 (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | DK-6789 (C) | 8287 | 51 | 53 | 191 | 97 | 70 | 71 |
| 2 | FH-988 | 8102 | 50 | 52 | 195 | 106 | 62 | 60 |
| 3 | FH-922 | 7483 | 52 | 54 | 193 | 110 | 67 | 67 |
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|---|---|---|---|---|---|---|---|---|
| 4 | FH-793 | 7352 | 52 | 54 | 192 | 102 | 71 | 71 |
| 5 | FH-810 | 7123 | 52 | 54 | 192 | 95 | 66 | 66 |
| 6 | FH-1012 | 6777 | 52 | 54 | 187 | 98 | 66 | 65 |
| 7 | FH-949 | 6712 | 52 | 54 | 202 | 97 | 62 | 62 |
| 8 | FH-1046 | 6211 | 51 | 54 | 183 | 94 | 60 | 60 |
| 9 | NT-6621( C) | 6177 | 52 | 54 | 193 | 98 | 54 | 57 |
| CV% | | 16.25 | 1.62 | 2.22 | 2.13 | 5.17 | 19.82 | 21.33 |
| LSD 5% | | NS | NS | NS | 7.08 | 8.93 | NS | NS |

Data presented in the Table 47 reveals statistically non-significant variation among local and commercial check hybrids. Local hybrid FH-1046 showed minimum cob height (94) while, the local hybrid FH-922 showed high cob bearing (110). All the hybrids exhibited cobs slightly above the mid cob bearing height.

## II. Hybrid Maize Macro Yield Trial No. 2: (Kharif 2016)

Twelve (12) entries including two hybrids as check were included in this trial. The trial was sown on 19-08-2016 in RCB design with three replications. The plot size was kept 5m x 2.25m. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 20-12-2016. Data regarding different characters were recorded and results are presented in Table 48.

**Table 48: Results of Hybrid Maize Macro Yield Trial-2 (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | DK-6789(C) | 9825a | 53 | 54 | 207 | 101 | 68 | 68 |
| 2 | FH-1042 | 9361ab | 54 | 55 | 190 | 108 | 71 | 71 |
| 3 | FH-1219 | 8325abc | 54 | 51 | 206 | 107 | 54 | 54 |
| 4 | FH-1231 | 8272abc | 54 | 57 | 194 | 105 | 58 | 58 |
| 5 | NT-6621 (C) | 8220abc | 53 | 55 | 209 | 104 | 68 | 68 |
| 6 | FH-1124 | 7729bcd | 53 | 53 | 184 | 94 | 60 | 60 |
| 7 | FH-1137 | 7713bcd | 53 | 55 | 193 | 101 | 55 | 55 |
| 8 | FH-929 | 7322cd | 54 | 55 | 208 | 106 | 54 | 54 |
| 9 | FH-928 | 6910cd | 52 | 55 | 183 | 93 | 50 | 50 |
| 10 | FH-1117 | 6876cd | 53 | 55 | 182 | 92 | 43 | 43 |
| 11 | FH-950 | 6850cd | 53 | 54 | 202 | 107 | 49 | 49 |
| 12 | FH-1119 | 6097d | 50 | 51 | 167 | 120 | 66 | 66 |
| CV% | | 13.58 | 2.87 | 3.50 | 1.13 | 15.89 | 20.66 | 14.89 |
| LSD 5% | | 1791.4 | 3.12 | 3.25 | 3.71 | 2.79 | 4.57 | 14.84 |

The results presented in the Table 48 showed that local hybrids FH-1042 (9361 kg/ha), FH-1219 (8325 kg/ha) and FH-1231 (8272 kg/ha) are statistically at par with the commercial check hybrid DK-6789 (9825 kg/ha) and NT-6621 (8220 kg/ha). The commercial check NT-6621 was the tallest hybrid (209 cm) while, the local hybrid FH-1119 showed minimum plant height (167 cm). Local hybrid FH-1117 showed minimum cob height (92cm) while, the local hybrid FH-1119 showed high cob bearing (120cm). All the hybrids exhibited cobs slightly above the mid cob bearing height. FH-1219 seemed to be early maturing by taking 50 days to complete its 50% silks while local hybrid FH-1231 was
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late maturing taking 57 days to silks. Number of plants and cobs harvested per plot were also showing statistically significant differences.

**2. Hybrid Maize Micro Yield Trials (Kharif 2016)**

Three sets of this trial were sown each with eighteen entries including two commercial hybrids as check except Trial No. 1 which includes one commercial check on 19-08-2016. The trial was laid out in RCB design with three replications. Two rows of five meters length for each entry were planted. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 19-12-2016. Data regarding different traits were recorded and are given in Table 49.

**Table 49: Results of Hybrid Maize Micro Yield Trial-1 (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1224 | 10385a | 52 | 54 | 185 | 96 | 46 | 48 |
| 2 | DK-6789 ( C) | 9539ab | 53 | 55 | 193 | 90 | 70 | 70 |
| 3 | FH-1025 | 8642abc | 52 | 54 | 202 | 91 | 48 | 48 |
| 4 | FH-1034 | 8591abc | 51 | 53 | 210 | 56 | 44 | 47 |
| 5 | FH-1163 | 7889bcd | 53 | 55 | 198 | 114 | 47 | 48 |
| 6 | FH-1227 | 7724bcd | 51 | 53 | 195 | 107 | 46 | 46 |
| 7 | FH-1146 | 7712bcd | 57 | 54 | 185 | 95 | 47 | 47 |
| `8 | FH-1205 | 7335cde | 52 | 54 | 202 | 91 | 44 | 44 |
| 9 | FH-1214 | 7072cde | 55 | 58 | 207 | 106 | 41 | 41 |
| 10 | FH-1204 | 6759cde | 53 | 55 | 197 | 100 | 45 | 45 |
| 11 | FH-1210 | 6571de | 52 | 54 | 194 | 88 | 47 | 47 |
| 12 | FH-1212 | 6475de | 55 | 57 | 188 | 96 | 43 | 43 |
| 13 | FH-1166 | 6415de | 50 | 52 | 195 | 119 | 45 | 45 |
| 14 | FH-1172 | 6210de | 52 | 54 | 194 | 96 | 47 | 47 |
| 15 | FH-1203 | 6158de | 55 | 57 | 192 | 101 | 42 | 44 |
| 16 | FH-1217 | 6156e | 53 | 55 | 202 | 99 | 41 | 41 |
| 17 | FH-1125 | 5635e | 48 | 50 | 188 | 101 | 42 | 42 |
| 18 | FH-1220 | 5531e | 52 | 54 | 180 | 84 | 34 | 34 |
| C. V.% | | 12.46 | 16.38 | 1.43 | 1.35 | 13.33 | 21.17 | 21.73 |
| LSD 5% | | 1909.5 | 3.12 | 2.81 | 5.52 | 2.46 | 4.92 | 3.58 |

Statistically significant differences due to hybrids were observed for grain yield in this trial. Local hybrid FH-1224 gave maximum grain yield 10385 kg/ha. Two local hybrids FH-1025 (8642 kg/ha) and FH-1034 (8591 kg/ha) are also at par with the commercial check hybrid DK-6789 (9539 kg/ha). FH-1125 seemed to be early maturing by taking 50 days to complete its 50% silks while local hybrid FH-1214 was late maturing taking 58 days to silks. The local hybrid FH-1034 showed maximum plant height (210 cm) while FH-1220 showed minimum plant height (180 cm). Local hybrid FH-1034 showed minimum cob height (56 cm) while the local hybrid FH-1166 showed high cob bearing (119 cm). The local hybrids FH-1025, FH-1034, FH-1205, FH-1210, FH-1217 and FH-1220 showed middle to low cob bearing trend. Number of plants and cobs harvested per plot were also showing statistically significant differences.
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**Table 50: Results of Hybrid Maize Micro Yield Trial-2 (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha | Days to 50% tassel | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | NT-6621 ( C) | 10585a | 52 | 55 | 197 | 97 | 41 | 43 |
| 2 | FH-1257 | 9129ab | 54 | 59 | 204 | 102 | 29 | 35 |
| 3 | DK-6789 ( C) | 8779ab | 53 | 55 | 196 | 101 | 38 | 38 |
| 4 | FH-1241 | 7782bc | 56 | 56 | 191 | 99 | 35 | 36 |
| 5 | FH-1254 | 7723bc | 51 | 54 | 193 | 110 | 36 | 35 |
| 6 | FH-1255 | 7480bc | 52 | 56 | 187 | 102 | 27 | 29 |
| 7 | FH-1229 | 7081bcd | 51 | 54 | 197 | 98 | 33 | 34 |
| 8 | FH-1246 | 6759b-e | 53 | 55 | 197 | 103 | 40 | 38 |
| 9 | FH-1243 | 6756b-e | 55 | 58 | 185 | 93 | 30 | 30 |
| 10 | FH-1262 | 6670b-e | 53 | 54 | 163 | 96 | 29 | 29 |
| 11 | FH-1245 | 6587b-e | 53 | 56 | 197 | 93 | 40 | 39 |
| 12 | FH-1252 | 5775cde | 55 | 56 | 191 | 102 | 34 | 33 |
| 13 | FH-1263 | 5588c-f | 52 | 55 | 171 | 83 | 33 | 32 |
| 14 | FH-1259 | 5530c-f | 54 | 57 | 188 | 93 | 26 | 25 |
| 15 | FH-1230 | 5472c-f | 52 | 54 | 182 | 97 | 29 | 30 |
| 16 | FH-1249 | 4750def | 52 | 55 | 188 | 97 | 25 | 26 |
| 17 | FH-1250 | 4271ef | 51 | 54 | 205 | 109 | 28 | 27 |
| 18 | FH-1233 | 3012f | 52 | 53 | 192 | 97 | 11 | 12 |
| CV.% | | 19.22 | 2.92 | 3.36 | 6.90 | 7.03 | 57.73 | 19.93 |
| LSD 5% | | 2698 | 3.21 | 3.93 | 16.79 | 5.1 | 15.26 | 13.24 |

Statistically significant differences due to hybrids were observed for grain yield in this trial. Commercial check NT-6621gave highest grain yield of 10585 kg/ha. The local hybrid FH-1257 (9129 kg/ha) and commercial check DK-6789 (8779 kg/ha) were at par with the top yielding hybrid. The local hybrid FH-1257 seem to be late maturing by taking 59 days to complete its 50% silks while local hybrid FH-1233 was early maturing taking 53 days to silks. The local hybrid FH-1250 showed maximum plant height (205 cm) while FH-1262 showed minimum plant height (163 cm). Local hybrid FH-1263 showed minimum cob height (83 cm) while the local hybrid FH-1254 showed high cob bearing (110 cm). Local hybrids FH-1275, FH-1229 and FH-1263 exhibited mid cob bearing. Number of plants and cobs harvested per plot were also showing statistically significant differences.

**Table 51: Results of Hybrid Maize Micro Yield Trial-3 (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1275 | 11290a | 52 | 54 | 177 | 102 | 52 | 53 |
| 2 | FH-1276 | 10778ab | 53 | 56 | 198 | 111 | 52 | 55 |
| 3 | FH-1231 | 10342abc | 53 | 55 | 206 | 109 | 40 | 40 |
| 4 | FH-1285 | 10177abc | 53 | 55 | 259 | 120 | 44 | 44 |
| 5 | FH-1289 | 10053abc | 54 | 56 | 211 | 101 | 47 | 48 |
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|---|---|---|---|---|---|---|---|---|
| 6 | FH-1269 | 8929a-d | 52 | 54 | 199 | 109 | 40 | 40 |
| 7 | FH-1292 | 8767a-d | 52 | 54 | 184 | 93 | 43 | 43 |
| 8 | FH-1266 | 8413a-d | 51 | 53 | 176 | 82 | 39 | 39 |
| 9 | DK-6789 (C) | 8305a-e | 53 | 55 | 254 | 102 | 40 | 39 |
| 10 | FH-1284 | 8288a-e | 53 | 55 | 193 | 114 | 41 | 41 |
| 11 | FH-1270 | 7152b-e | 52 | 54 | 195 | 104 | 36 | 36 |
| 12 | NT-6621 (C) | 6804c-f | 53 | 56 | 176 | 98 | 32 | 32 |
| 13 | FH-1287 | 5290d-g | 53 | 55 | 193 | 107 | 25 | 25 |
| 14 | FH-1281 | 5234d-g | 56 | 58 | 166 | 94 | 39 | 39 |
| 15 | FH-1286 | 5207d-g | 52 | 56 | 147 | 66 | 40 | 40 |
| 16 | FH-1282 | 4606efg | 56 | 58 | 186 | 92 | 21 | 21 |
| 17 | FH-1280 | 3408fg | 57 | 60 | 161 | 84 | 22 | 23 |
| 18 | FH-1291 | 1584g | 59 | 62 | 138 | 60 | 16 | 16 |
| CV% | | 23.67 | 1.39 | 1.74 | 34.41 | 1.42 | 14.12 | 18.28 |
| LSD 5% | | 3735.3 | 1.55 | 2.03 | 4.45 | 2.90 | 12.4 | 14.33 |

Statistically significant differences due to hybrids were observed for grain yield in this trial. Local hybrid FH-1275 gave maximum grain yield of 11290 kg/ha followed by local hybrid FH-1276 (10778 kg/ha), FH-1231 (10342 kg/ha), FH-1285 (10177 kg/ha) and FH-1289 (10053 kg/ha) which are statistically at par with commercial hybrids DK-6789 (8305 kg/ha) and NT-6621 (6804 kg/ha). The local hybrid FH-1285 showed maximum plant height (259 cm) while FH-1291 showed minimum plant height (138 cm). Local hybrid FH-1291 showed minimum cob height (60 cm) while, the local hybrid FH-1285 showed high cob bearing (120 cm). The hybrids FH-1231, FH-1266, FH-1285, FH-1286 and FH-1291 exhibited mid to low cob bearing characteristic. FH-1266 seemed to be early maturing by taking 53 days to complete its 50% silks while local hybrid FH-1291 was late maturing taking 62 days to silks. Number of plants and cobs harvested per plot were also showing statistically significant differences.

### 3. Hybrid Maize Preliminary Yield Trials (Kharif2016)

Two sets of this trial were sown on 19-08-2016 with twenty eight entries each including two commercial hybrids as check. The trial was laid out in RCB design with three replications. Two rows of five meters length for each entry were planted. Standard agronomic and plant protection measures were carried out in the crop. The harvesting was done on 20-12-2016. Data regarding different traits was recorded and elite hybrids were selected for further evaluation. The data are given in Table 52.

**Table 52: Results of Hybrid Maize Preliminary Yield Trial-1 (Kharif 2016), Faisalabad.**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1293 | 10853 | 53 | 55 | 194 | 92 | 23 | 23 |
| 2 | FH-1304 | 10136 | 54 | 56 | 175 | 107 | 23 | 23 |
| 3 | DK-6789 (C) | 10066 | 53 | 55 | 203 | 116 | 23 | 23 |
| 4 | FH-1306 | 9636 | 53 | 55 | 180 | 96 | 24 | 24 |
| 5 | FH-922 | 9604 | 50 | 52 | 190 | 108 | 25 | 25 |
| 6 | FH-1312 | 9364 | 52 | 54 | 173 | 86 | 24 | 24 |
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|---|---|---|---|---|---|---|---|---|
| 7 | FH-1046 | 9267 | 53 | 55 | 194 | 109 | 23 | 23 |
| 8 | FH-1308 | 9074 | 52 | 54 | 179 | 90 | 25 | 25 |
| 9 | FH-1297 | 9054 | 52 | 54 | 199 | 99 | 15 | 15 |
| 10 | FH-1314 | 8700 | 53 | 55 | 201 | 100 | 18 | 18 |
| 11 | FH-1317 | 8387 | 55 | 56 | 176 | 79 | 25 | 25 |
| 12 | FH-1305 | 8234 | 51 | 53 | 188 | 109 | 24 | 24 |
| 13 | FH-1313 | 7924 | 51 | 54 | 174 | 83 | 24 | 24 |
| 14 | NT-6621 (C) | 7911 | 54 | 56 | 199 | 107 | 21 | 21 |
| 15 | FH-1307 | 7755 | 50 | 52 | 179 | 96 | 25 | 25 |
| 16 | FH-1294 | 7668 | 50 | 52 | 189 | 96 | 25 | 25 |
| 17 | FH-988 | 7361 | 51 | 53 | 207 | 106 | 24 | 24 |
| 18 | FH-1292 | 7055 | 52 | 54 | 190 | 105 | 22 | 22 |
| 19 | FH-1296 | 6983 | 50 | 52 | 169 | 80 | 12 | 12 |
| 20 | FH-1301 | 6939 | 53 | 55 | 158 | 87 | 23 | 23 |
| 21 | FH-1302 | 6727 | 51 | 53 | 151 | 83 | 18 | 18 |
| 22 | FH-1295 | 6512 | 51 | 54 | 173 | 83 | 12 | 12 |
| 23 | FH-1300 | 5630 | 54 | 56 | 161 | 94 | 17 | 17 |
| 24 | FH-1310 | 5368 | 51 | 53 | 185 | 91 | 23 | 23 |
| 25 | FH-1299 | 5335 | 53 | 55 | 178 | 91 | 19 | 19 |
| 26 | FH-1316 | 5256 | 55 | 57 | 178 | 92 | 15 | 15 |
| 27 | FH-1298 | 5196 | 53 | 55 | 158 | 88 | 14 | 14 |
| 28 | FH-1303 | 5159 | 55 | 57 | 185 | 92 | 14 | 14 |
| CV% | | 29.78 | 2.18 | 2.13 | 3.46 | 13.11 | 12.23 | 11.74 |
| LSD 5% | | NS | 2.33 | 2.36 | 12.98 | 2.06 | 5.07 | 5.46 |

Data presented in Table 52 reveals statistically non-significant differences due to hybrids in grain yield kg/ha among entries included in this trial. Local hybrid FH-1293 gave maximum grain yield 10853 kg/ha followed by FH-1304 (10136 kg/ha). The local hybrid FH-988 showed maximum plant height (207 cm) while FH-1302 showed minimum plant height (151 cm). Local hybrid FH-1317 showed minimum cob height (79 cm) while the local hybrid FH-1046 showed high cob bearing (109 cm). The hybrids FH-1293, FH-1312, FH-1314, FH-1313, FH-1296, FH-1295 and FH-1310 exhibited mid to low cob bearing character. The local hybrids FH-1296, FH-1307, FH-1294 and FH-922 seemed to be early maturing by taking 52 days to complete their 50% silks while local hybrid FH-1316 was late maturing taking 57 days to silks.

**Table 53: Results of Hybrid Maize Preliminary Yield Trial-2 (Kharif 2016), Faisalabad.**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs/ plot harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-922 | 13747a | 52 | 54 | 195 | 111 | 24 | 26 |
| 2 | FH-1322-1 | 12514ab | 51 | 53 | 206 | 115 | 25 | 24 |
| 3 | FH-1329 | 12038abc | 54 | 56 | 204 | 107 | 24 | 26 |
| 4 | FH-1323 | 11955abc | 53 | 55 | 199 | 110 | 25 | 23 |
| 5 | DK-6789(C) | 11600a-d | 55 | 57 | 210 | 104 | 25 | 25 |
| 6 | FH-1342 | 10941a-e | 53 | 55 | 182 | 90 | 25 | 24 |
| 7 | FH-1338 | 10758a-f | 55 | 57 | 183 | 108 | 22 | 24 |
| 8 | NT-6621(C) | 10513a-f | 53 | 55 | 207 | 104 | 25 | 24 |
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|---|---|---|---|---|---|---|---|---|
| 9 | FH-1328 | 10440b-f | 51 | 53 | 172 | 98 | 24 | 23 |
| 10 | FH-1318 | 10248b-f | 52 | 54 | 173 | 90 | 26 | 22 |
| 11 | FH-1334 | 10039b-f | 55 | 57 | 205 | 108 | 21 | 20 |
| 12 | FH-1319 | 9460b-g | 50 | 52 | 201 | 105 | 24 | 24 |
| 13 | FH-1333 | 9267b-h | 55 | 57 | 198 | 112 | 22 | 18 |
| 14 | FH-1337 | 9047c-i | 56 | 58 | 200 | 101 | 18 | 18 |
| 15 | FH-988 | 8952c-i | 54 | 56 | 208 | 119 | 25 | 19 |
| 16 | FH-1320 | 8555d-i | 53 | 55 | 184 | 104 | 24 | 23 |
| 17 | FH-1327 | 7946e-i | 51 | 53 | 185 | 101 | 24 | 20 |
| 18 | FH-1046 | 7879e-i | 53 | 55 | 194 | 101 | 25 | 26 |
| 19 | FH-1326 | 7797e-i | 52 | 54 | 178 | 99 | 23 | 21 |
| 20 | FH-1325 | 7573f-i | 52 | 54 | 188 | 102 | 24 | 18 |
| 21 | FH-1321 | 6595g-j | 53 | 55 | 162 | 93 | 23 | 23 |
| 22 | FH-1340 | 6132h-k | 55 | 57 | 199 | 113 | 20 | 17 |
| 23 | FH-1341 | 5959ijk | 55 | 57 | 197 | 100 | 12 | 13 |
| 24 | FH-1330 | 3307jkl | 53 | 55 | 185 | 95 | 24 | 23 |
| 25 | FH-1339 | 3010jkl | 57 | 59 | 203 | 102 | 19 | 19 |
| 26 | FH-1324 | 1663kl | 52 | 54 | 191 | 102 | 22 | 12 |
| 27 | FH-1322-2 | 1456kl | 56 | 58 | 169 | 92 | 14 | 14 |
| 28 | FH-1331 | 1398kl | 55 | 58 | 197 | 98 | 14 | 14 |
| CV% | | 18.89 | 1.74 | 1.70 | 1.85 | 1.15 | 6.61 | 12.98 |
| LSD 5% | | 3298.8 | 1.90 | 1.93 | 2.57 | 2.42 | 2.92 | 5.32 |

Statistical analysis of data presented in above table reveals significant differences due to hybrids in grain yield kg/ha among entries included in this trial. The local hybrid FH-922 out yielded all the hybrids with yield 13747 kg/ha followed by FH-1322-1 (12514 kg/ha). The local hybrids FH-1329 (12038 kg/ha), FH-1323 (11955 kg/ha), FH-1342 (10941 kg/ha) and FH-1338 (10758 kg/ha) were also statistically at par with commercial check hybrids DK-6789 (11600 kg/ha) and NT-6621 (10513 kg/ha). Commercial check hybrid DK-6789 showed maximum plant height (210 cm) while FH-1321 showed minimum plant height (162 cm). Local hybrid FH-1342 showed minimum cob height (90 cm) while the local hybrid FH-988 showed high cob bearing (119 cm). The hybrid FH-1342 possessed mid cob bearing trait while all the rest hybrids possessed above the mid plant height cob bearing character. FH-1319 seemed to be early maturing by taking 51 days to complete its 50% silks while local hybrid FH-1339 was late maturing taking 59 days to silks. Number of plants and cobs harvested per plot were also showing statistically significant differences.

**Table 54: Results of Hybrid Maize Preliminary Yield Trial-3 (Kharif 2016), Faisalabad.**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs/ plot harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-922 | 13329a | 51 | 53 | 196 | 109 | 26 | 22 |
| 2 | FH-1350 | 11939ab | 52 | 54 | 199 | 107 | 24 | 23 |
| 3 | DK-6789( C) | 11447abc | 53 | 54 | 202 | 105 | 24 | 22 |
| 4 | NT-6621( C) | 11341abc | 53 | 55 | 202 | 96 | 23 | 23 |
| 5 | FH-988 | 10642a-d | 52 | 55 | 192 | 111 | 19 | 16 |
| 6 | FH-1364 | 10555bcd | 51 | 53 | 198 | 107 | 23 | 21 |
| 7 | FH-1348 | 10443bcd | 55 | 57 | 193 | 103 | 23 | 21 |
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|---|---|---|---|---|---|---|---|---|
| 8 | FH-1046 | 10093bcd | 53 | 58 | 188 | 80 | 20 | 20 |
| 9 | FH-1343 | 10067bcd | 52 | 54 | 193 | 93 | 20 | 20 |
| 10 | FH-1368 | 10035bcd | 50 | 52 | 204 | 102 | 20 | 20 |
| 11 | FH-1351 | 9513bcd | 51 | 53 | 184 | 86 | 23 | 21 |
| 12 | FH-1352 | 9126cd | 55 | 58 | 205 | 106 | 23 | 23 |
| 13 | FH-1366 | 9112cd | 53 | 57 | 183 | 101 | 19 | 19 |
| 14 | FH-1345 | 8554d | 52 | 55 | 184 | 94 | 23 | 20 |
| 15 | FH-1346 | 8422d | 52 | 54 | 203 | 105 | 24 | 24 |
| 16 | FH-1344 | 8401d | 51 | 53 | 189 | 98 | 19 | 17 |
| 17 | FH-1353 | 8232de | 52 | 56 | 185 | 84 | 19 | 16 |
| 18 | FH-1361 | 8103de | 52 | 54 | 194 | 96 | 18 | 16 |
| 19 | FH-1365 | 7992de | 53 | 56 | 194 | 106 | 17 | 17 |
| 20 | FH-1347 | 5614ef | 52 | 55 | 195 | 100 | 14 | 13 |
| 21 | FH-1354 | 4544fg | 52 | 54 | 193 | 94 | 12 | 10 |
| 22 | FH-1363 | 4272fg | 52 | 54 | 192 | 92 | 11 | 8 |
| 23 | FH-1355 | 4218fg | 52 | 54 | 183 | 91 | 9 | 7 |
| 24 | FH-1359 | 3547fg | 51 | 53 | 172 | 84 | 7 | 5 |
| 25 | FH-1356 | 2590g | 52 | 54 | 192 | 91 | 8 | 4 |
| 26 | FH-1358 | 2080g | 52 | 54 | 169 | 83 | 7 | 4 |
| 27 | FH-1362 | 1988g | 55 | 58 | 165 | 62 | 5 | 3 |
| 28 | FH-1349 | 1817g | 60 | 63 | 139 | 52 | 12 | 9 |
| CV% | | 13.79 | 3.51 | 3.43 | 1.60 | 4.39 | 17.60 | 20.10 |
| LSD 5% | | 2762 | 3.77 | 3.86 | 6.21 | 8.45 | 6.24 | 6.42 |

Statistical analysis of data presented in above table reveals significant differences due to hybrids in grain yield kg/ha. The local hybrid FH-922 with grain yield 13329 kg/ha out yielded all the hybrids. The hybrids FH-1350 (11939 kg/ha) and FH-988 (10642 kg/ha) were also at par with the commercial checks DK-6789 (11447 kg/ha) and NT-6621 (11341 kg/ha). The local hybrid FH-1352 showed maximum plant height (205 cm) while FH-1349 showed minimum plant height (139 cm). Local hybrid FH-1349 showed minimum cob height (52 cm) while the most of the promising local hybrids showed mid to low cob bearing character. FH-1368 seemed to be early maturing by taking 52 days to complete its 50% silks while local hybrid FH-1349 was late maturing taking 63 days to silks. Number of plants and cobs harvested per plot were also showing statistically significant differences.

### 4. National Uniform Hybrid Maize Yield Trial (Kharif2016)

This trial was sown with Forty two (42) entries on 19-08-2016 laid out in RCB design with three replications. Two rows of five meters length for each entry were planted. Standard agronomic and plant protection measures were carried out in the experiment. Harvesting was done on 21-12-2016. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in following table.

**Table 55: Results of National Uniform Hybrid Maize (Yellow) Yield (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield (kg/ha) | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 15876a | 51 | 54 | 218 | 113 | 46 | 46 |
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|---|---|---|---|---|---|---|---|---|
| 2 | 42 | 13707ab | 51 | 53 | 206 | 98 | 48 | 48 |
| 3 | 19 | 13573ab | 50 | 52 | 208 | 109 | 35 | 35 |
| 4 | 30 | 13248abc | 53 | 55 | 210 | 103 | 39 | 40 |
| 5 | 6 | 13165a-d | 53 | 55 | 224 | 128 | 37 | 37 |
| 6 | 7 | 13026a-e | 54 | 56 | 220 | 120 | 41 | 41 |
| 7 | 38 | 12490b-f | 51 | 53 | 218 | 112 | 42 | 42 |
| 8 | 25 | 12248b-g | 54 | 56 | 223 | 109 | 44 | 44 |
| 9 | 35 | 12106bc-h | 54 | 56 | 237 | 131 | 36 | 36 |
| 10 | 12 | 11985bc-h | 53 | 55 | 209 | 90 | 43 | 43 |
| 11 | 33 | 11843b-i | 52 | 54 | 234 | 127 | 34 | 34 |
| 12 | 31 | 11593b-i | 53 | 55 | 220 | 122 | 41 | 41 |
| 13 | 22 | 11440b-j | 52 | 52 | 233 | 115 | 39 | 39 |
| 14 | 26 | 11369b-k | 53 | 55 | 220 | 115 | 34 | 34 |
| 15 | 10 | 11305b-k | 53 | 55 | 215 | 112 | 38 | 38 |
| 16 | 41 | 11070b-l | 52 | 54 | 232 | 124 | 39 | 39 |
| 17 | 39 | 10951b-l | 53 | 55 | 214 | 107 | 42 | 42 |
| 18 | 28 | 10465c-m | 55 | 57 | 209 | 113 | 41 | 41 |
| 19 | 23 | 10294c-m | 53 | 55 | 215 | 110 | 38 | 38 |
| 20 | 29 | 10152d-m | 51 | 53 | 222 | 129 | 33 | 33 |
| 21 | 9 | 10051e-m | 51 | 53 | 215 | 126 | 30 | 30 |
| 22 | 20 | 10006e-m | 53 | 55 | 233 | 121 | 34 | 34 |
| 23 | 11 | 9620f-m | 53 | 55 | 240 | 142 | 34 | 34 |
| 24 | 18 | 9295g-m | 55 | 57 | 239 | 131 | 37 | 37 |
| 25 | 32 | 9212g-m | 50 | 53 | 207 | 112 | 36 | 35 |
| 26 | 36 | 9125h-m | 54 | 56 | 221 | 127 | 34 | 34 |
| 27 | 8 | 9114h-m | 55 | 57 | 232 | 127 | 26 | 26 |
| 28 | 40 | 8802i-m | 53 | 55 | 187 | 102 | 38 | 38 |
| 29 | 16 | 8403j-m | 53 | 55 | 223 | 111 | 40 | 40 |
| 30 | 27 | 8331klm | 51 | 54 | 205 | 112 | 28 | 28 |
| 31 | 21 | 8094lm | 53 | 55 | 213 | 133 | 31 | 31 |
| 32 | 17 | 8063lm | 53 | 55 | 207 | 107 | 30 | 30 |
| 33 | 24 | 7786 m | 52 | 54 | 238 | 141 | 28 | 28 |
| 34 | 37 | 7434mn | 52 | 54 | 248 | 126 | 22 | 22 |
| 35 | 5 | 4671no | 52 | 54 | 236 | 130 | 12 | 12 |
| 36 | 34 | 4440no | 55 | 56 | 223 | 123 | 13 | 13 |
| 37 | 1 | 3897op | 51 | 53 | 234 | 130 | 13 | 13 |
| 38 | 15 | 3226op | 54 | 55 | 205 | 73 | 18 | 18 |
| 39 | 2 | 2979op | 51 | 53 | 214 | 112 | 12 | 12 |
| 40 | 3 | 904p | 54 | 55 | 209 | 103 | 3 | 3 |
| 41 | 4 | - | - | - | - | - | - | - |
| 42 | 14 | - | - | - | - | - | - | - |
| CV% | | 15.88 | 0.84 | 1.09 | 1.44 | 1.64 | 14.47 | 14.50 |
| LSD 5% | | 3095 | 0.89 | 1.20 | 6.38 | 3.85 | 9.51 | 9.53 |

Table 55 contains data analysis of the trial at Faisalabad location. Seed of two entries coded as 4 and 14 did not germinate at this site. Analysis of data revealed that statistically significant differences exist for grain yield kg/ha among entries included in this trial. The
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entry coded as 13 with grain yield 15876 kg/ha out yielded all other entries. The entries no 42, 19, 30, 6, and 7 with respective yields (15876 kg/ha), (13707 kg/ha), (13573 kg/ha), (13248 kg/ha) and (13165 kg/ha) were at par with the top yielding hybrids. The entry no. 3 was the lower yielder (904 kg/ha) among all other entries at this location. Statistically significant differences were also observed for traits days to 50% silking, plant height, cob height, No. of plants and cobs harvested.

### 5. National Uniform Hybrid Maize (White) Yield Trial (Kharif2016)

This trial was sown with twenty entries on 19-08-2016. The trials were laid out in RCB design with three replications. Two rows of five meters length for each entry were planted. Standard agronomic and plant protection measures were carried out in the experiment. Harvesting was done on 22-12-2016. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in following table.

**Table 56: Results of National Uniform Hybrid Maize (White) Yield (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 12265a | 52 | 54 | 232 | 121 | 46 | 46 |
| 2 | 9 | 12144ab | 54 | 56 | 227 | 121 | 31 | 31 |
| 3 | 7 | 11009abc | 54 | 56 | 211 | 100 | 38 | 38 |
| 4 | 11 | 10905abc | 51 | 53 | 227 | 122 | 41 | 41 |
| 5 | 3 | 10485a-d | 52 | 54 | 236 | 118 | 35 | 35 |
| 6 | 14 | 10430a-d | 52 | 54 | 197 | 95 | 34 | 34 |
| 7 | 18 | 9753b-e | 52 | 54 | 204 | 105 | 37 | 37 |
| 8 | 17 | 9420cde | 54 | 56 | 193 | 111 | 30 | 30 |
| 9 | 16 | 8934c-f | 54 | 56 | 217 | 120 | 28 | 28 |
| 10 | 8 | 8833c-g | 51 | 53 | 183 | 98 | 23 | 23 |
| 11 | 2 | 8363d-g | 52 | 54 | 194 | 94 | 30 | 30 |
| 12 | 19 | 8211d-g | 55 | 57 | 197 | 94 | 33 | 33 |
| 13 | 12 | 8107d-g | 53 | 55 | 225 | 117 | 26 | 26 |
| 14 | 10 | 7706e-h | 53 | 55 | 197 | 13 | 36 | 36 |
| 15 | 5 | 6803fgh | 51 | 53 | 181 | 116 | 30 | 30 |
| 16 | 20 | 6785fgh | 51 | 53 | 213 | 116 | 32 | 32 |
| 17 | 13 | 6484gh | 54 | 56 | 228 | 131 | 22 | 22 |
| 18 | 6 | 5374h | 51 | 53 | 198 | 112 | 17 | 17 |
| 19 | 4 | 5325h | 55 | 57 | 195 | 98 | 20 | 20 |
| 20 | 1 | - | - | - | - | - | - | - |
|  | CV% | 13.18 | 0.72 | 0.69 | 0.69 | 2.36 | 18.92 | 18.92 |
|  | LSD 5% | 2438 | 0.79 | 0.79 | 3.03 | 5.22 | 12.41 | 12.41 |

Table 56 contains data analysis of the trial at Faisalabad location. Seed of Entry coded 1 did not germinate at this location. Analysis of data revealed that statistically significant differences exist for grain yield kg/ha among entries included in this trial. The entry no. 15 with grain yields 12265 kg/ha out yielded all other entries included. The entry no. 9, 7, 11, 3 and 14 were at par with the top yielding entry. Most of the entries were with cobs above the mid plant height. The entry 4 was lower yielder giving 5325 kg/ha at this
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location. Statistically significant differences were also observed for traits days to 50% silking, plant height, cob height, no. of plants and cobs harvested.

### 6. National Uniform Varietal Maize Yield Trial (Kharif2016)

This trial was sown with sixteen entries on 19-08-2016. The trial was laid out in RCB design with three replications. Two rows of five meters length for each entry were planted. Standard agronomic and plant protection measures were carried out in the experiment. Harvesting was done on 22-12-2016. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in following table.

**Table 57: Results of National Uniform Varietal Maize Yield (Kharif 2016), Faisalabad**

| Rank No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 7517a | 51 | 53 | 213 | 132 | 31 | 31 |
| 2 | 9 | 7030ab | 53 | 55 | 156 | 74 | 29 | 29 |
| 3 | 2 | 6851abc | 52 | 54 | 187 | 96 | 34 | 34 |
| 4 | 16 | 6387a-d | 54 | 56 | 154 | 79 | 23 | 23 |
| 5 | 4 | 5890a-e | 52 | 54 | 202 | 112 | 22 | 22 |
| 6 | 10 | 5741a-f | 53 | 54 | 215 | 108 | 32 | 32 |
| 7 | 13 | 5611a-f | 54 | 56 | 206 | 98 | 23 | 23 |
| 8 | 8 | 5318b-g | 54 | 56 | 217 | 118 | 18 | 18 |
| 9 | 14 | 4701c-g | 52 | 56 | 219 | 117 | 32 | 32 |
| 10 | 5 | 4496d-g | 52 | 54 | 188 | 103 | 26 | 26 |
| 11 | 15 | 4485d-g | 52 | 54 | 224 | 118 | 23 | 23 |
| 12 | 12 | 4043efg | 52 | 54 | 206 | 102 | 22 | 22 |
| 13 | 3 | 3860efg | 51 | 53 | 199 | 103 | 7 | 7 |
| 14 | 7 | 3620fg | 51 | 53 | 208 | 113 | 24 | 24 |
| 15 | 11 | 3306g | 51 | 53 | 207 | 117 | 19 | 19 |
| 16 | 6 | 1098h | 53 | 56 | 172 | 89 | 12 | 12 |
| CV% | | 20.43 | 1.05 | 0.75 | 2.16 | 4.68 | 16.57 | 16.57 |
| LSD 5% | | 2176 | 1.16 | 0.87 | 9.13 | 10.42 | 8.20 | 8.20 |

Data analysis of the trial conducted at Faisalabad location is given in Table 57. Analysis of data showed that statistically significant differences exist for grain yield kg/ha among entries included in this trial. The entry coded 1 was top yielder with grain yield 7517 kg/ha. The entry 6 was lower yielder giving 1098 kg/ha at this location. The entry 9, 2, 16, 4, 10, 13 were at par with the top yielding entry. Statistically significant differences were also observed for traits days to 50% silking, plant height, cob height, no. of plants and cobs harvested.

### 7. Demonstration/ On-Farm Yield Trials:

**Table 58. Demonstration Trial:**

| | Locations | Varieties/ Hybrids | Grain yield (Kg/ha) |
|---|---|---|---|
| 1 | Chak 544 GB, Tandlianwala | DTC | 7433 |
| 2 | Chak 255GB, Jhang | DTC | 6778 |
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|---|---|---|---|
| 3 | MauzaLashari, Jhang | DTC | 6145 |
| 4 | Chak 555, M-kanjan | DTC | 7520 |
| 5 | Chak 87 JB, T.T Singh | DTC | 5984 |
| 6 | Chak 27 SB, Sargodha | DTC | 6572 |
| 7 | NTL Farm Sialkot road Daska | FH-922 | 9824 |
| | | FH-949 | 10462 |
| | | FH-988 | 9278 |
| | | FH-1046 | 11783 |
| | | Malka-2016 | 7549 |

**8. Seed Production:**

**TABLE 59: Seed Production (Kharif 2016), Faisalabad.**

| | **Inbred lines/ Hybrids/OPV** | **Quantity (kg)** |
|---|---|---|
| **Single Crosses** | FH-793 | 08 |
| | FH-949 | 80 |
| | FH-988 | 07 |
| | FH-1046 | 385 |
| | FH-1292 | 10 |
| | Total | 490 |
| **OPV** | Malka-2016 | 430 |

# SPRING 2017:

Thirteen (13) different yield trials of hybrids were sown for evaluation.

1. **Hybrid Maize Macro Yield Trial No. 1 (Spring 2017)**

A trial comprised of nine single cross hybrids including two commercial hybrids as check was sown on 20-02-2017 according to RCB design with three replications. The plot size was kept 5m x 3m. The harvesting was done on 20-06-2016. Data regarding different agronomic traits were recorded and hybrids showing good performances were selected for on farm testing. The data are given in Table 60.

**Table 60: Results of Hybrid Maize Macro Yield Trial No. 1 (Spring 2017), Faisalabad**

| **Sr. No.** | **Entry** | **Grain yield kg/ha.** | **Days to 50% tassel.** | **Days to 50% silk** | **Plant Height (cm)** | **Cob Height (cm)** | **No. of plants harv.** | **No. of cobs harv.** |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1012 | 10613a | 77 | 79 | 173 | 85 | 101 | 94 |
| 2 | FH-922 | 9326b | 73 | 74 | 166 | 87 | 98 | 94 |
| 3 | FH-949 | 9146bc | 77 | 78 | 174 | 85 | 96 | 90 |
| 4 | FH-929 | 8607bcd | 78 | 79 | 178 | 83 | 92 | 82 |
| 5 | FH-793 | 8154cd | 77 | 79 | 172 | 96 | 100 | 93 |
| 6 | FH-988 | 7835d | 78 | 80 | 187 | 96 | 95 | 74 |
| 7 | NK-8441 (C) | 6518e | 74 | 76 | 181 | 84 | 99 | 85 |
| 8 | FH-1046 (C) | 5379f | 77 | 79 | 171 | 82 | 76 | 62 |
| 9 | DK-6724 | 4767f | 72 | 74 | 153 | 70 | 96 | 76 |
| | CV% | 8.08 | 1.66 | 1.65 | 2.23 | 5.99 | 5.78 | 7.07 |
| | LSD 5% | 1092 | 2.18 | 2.21 | 6.66 | 8.84 | 9.48 | 10.2 |
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Data presented in the Table 60 reveals statistically significant differences in grain yield due to hybrids. The hybrid FH-1012 gave maximum grain yield of 10613 Kg/ha. Other local hybrids FH-922, FH-949, FH-929 were also statistically significantly higher yielder than commercial check NK-8441 (651 Kg/ha) and DK-6724 (4767 kg/ha). Significant differences were observed for days to 50% tasseling and silking also. Local hybrid FH-988 took the maximum days for 50% tasseling (78) and silking (80). Local hybrid FH-988 attained the maximum plant height of 187 cm while commercial check DK-6724 attained the minimum (153cm). Commercial hybrid DK-6724 showed minimum cob height of 70 cm while local hybrids FH-793 and FH-988 showed maximum cob height of 96 cm. Most of the hybrids exhibited mid to low cob bearing character. Number of plants per plot and cobs harvested were also showing statistically significant differences.

## 2. Hybrid Maize Macro Yield Trial No.2 (Spring 2017)

This trial comprised of twelve single cross hybrids including two commercial hybrids as check was sown on 20-02-2017. The trial was laid out according to RCB design with three replications. The plot size was kept 5m x 2.25m. The harvesting was done on 20-06-2016. Data regarding different agronomic traits were recorded and hybrids with good performances were selected for on farm testing. The data are presented in Table 61.

**Table 61: Results of Hybrid Maize Macro Yield Trial No. 2 (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha | Days to 50% tassel | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1205 | 9835a | 71 | 75 | 171 | 92 | 76 | 73 |
| 2 | FH-950 | 9683a | 71 | 74 | 172 | 101 | 77 | 72 |
| 3 | FH-1137 | 9405ab | 78 | 80 | 159 | 98 | 75 | 69 |
| 4 | FH-1166 | 8723abc | 70 | 72 | 163 | 85 | 77 | 62 |
| 5 | FH-1275 | 8365abc | 73 | 75 | 143 | 73 | 75 | 61 |
| 6 | FH-932 | 7940bcd | 72 | 75 | 161 | 93 | 76 | 65 |
| 7 | FH-1201 | 7848cde | 75 | 76 | 183 | 97 | 75 | 55 |
| 8 | FH-1125 | 7545cdef | 75 | 76 | 153 | 93 | 75 | 67 |
| 9 | FH-1114 | 6658def | 77 | 79 | 156 | 93 | 76 | 63 |
| 10 | FH-1231 | 6347efg | 75 | 77 | 172 | 93 | 75 | 46 |
| 11 | NK-8441 (C) | 6022fg | 71 | 74 | 132 | 73 | 76 | 56 |
| 12 | DK-6724 (C) | 5013g | 72 | 75 | 144 | 68 | 65 | 50 |
| | CV% | 11.66 | 1.75 | 1.48 | 1.70 | 1.58 | 3.41 | 11.79 |
| | LSD 5% | 1535 | 2.17 | 1.89 | 4.59 | 2.35 | 4.32 | 12.92 |

Data presented in above table reveals that differences in mean grain yields due to hybrid were significant. The local hybrid FH-1205 gave the highest grain yield of 9835 kg/ha followed by the local hybrids FH-950, FH-1137, FH-1166 and FH-1275 which were at par with the top yielding local hybrid with respective yields of 9683 kg/ha, 9405 kg/ha, 8723 kg/ha and 8365 kg/ha. Both the commercial checks were the lowest yielder among all the hybrids included in the trial. Differences in days to 50% tasseling and silking were also significant. Commercial hybrid FH-1137 took the maximum 78 days to 50% tasseling and 80 days to 50% silking. Local hybrid FH-1201 attained maximum plant height of 183cm.
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Number of plants per plot and cobs harvested were also showing statistically significant differences.

### 3. Hybrid Maize Micro Yield Trials (Spring 2017)

This trial comprised of two sets each containing seventeen single cross hybrids including two commercial hybrids as check sown on 20-02-2017, laid out according to RCB design with three replications. The plot size was kept 5m x 1.5m. The harvesting was done on 21-06-2016. 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 62: Results of Hybrid Maize Micro Yield Trial-1 (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha | Days to 50% tassel | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1266 | 9137a | 70 | 72 | 162 | 92 | 52 | 47 |
| 2 | FH-1287 | 9070ab | 72 | 74 | 178 | 86 | 51 | 52 |
| 3 | FH-1261 | 9024ab | 77 | 78 | 158 | 86 | 48 | 52 |
| 4 | FH-1278 | 8866abc | 75 | 77 | 168 | 90 | 49 | 38 |
| 5 | FH-1252 | 8830abc | 75 | 77 | 130 | 66 | 46 | 51 |
| 6 | FH-1290 | 8576abcd | 71 | 73 | 209 | 102 | 48 | 45 |
| 7 | FH-1210 | 8281abcde | 70 | 72 | 172 | 82 | 49 | 49 |
| 8 | FH-1241 | 7388bcdef | 72 | 74 | 167 | 72 | 48 | 46 |
| 9 | FH-1248 | 7315cdefg | 74 | 77 | 156 | 69 | 49 | 46 |
| 10 | FH-1243 | 7061defg | 74 | 77 | 162 | 74 | 47 | 29 |
| 11 | FH-985 | 6994defg | 73 | 76 | 152 | 65 | 47 | 38 |
| 12 | FH-1206 | 6858efg | 71 | 73 | 162 | 53 | 50 | 47 |
| 13 | FH-1247 | 6648efg | 75 | 78 | 171 | 84 | 42 | 38 |
| 14 | DK-6724 (C) | 6430fg | 71 | 74 | 153 | 67 | 43 | 41 |
| 15 | FH-1280 | 6386fgh | 73 | 75 | 153 | 78 | 51 | 45 |
| 16 | NK-8441 (C) | 5640gh | 74 | 76 | 147 | 63 | 44 | 43 |
| 17 | FH-1260 | 4701h | 77 | 79 | 124 | 53 | 46 | 25 |
| CV% | | 10.69 | 1.28 | 1.15 | 3.74 | 2.00 | 6.50 | 10.47 |
| LSD 5% | | 1695 | 1.98 | 1.83 | 12.69 | 3.24 | NS | 9.48 |

Data presented in above table reveals that differences in mean grain yields due to hybrids were statistically significant. Local hybrid FH-1266 gave the maximum grain yield of 9137 kg/ha followed by the local hybrids FH-1287 (9070 kg/ha), FH-1261 (9024 kg/ha), FH-1278 (8866 kg/ha), FH-1252 (8830 kg/ha), FH-1290 (8576 kg/ha) and FH-1210 (8281 kg/ha) which were at par with the top yielding hybrid. Significant differences were also observed for days to 50% tasseling and silking. The minimum no. of days to 50% tasseling (70) was observed for local hybrids FH-1266 and FH-1210. Differences in plant height and cob height were also significant. Mid to a bit higher than middle stem length, cob presence was observed, in most of the hybrids. The maximum plant height (209 cm) was shown by FH-1290 while the minimum plant height (124 cm) was observed for local hybrid FH-1260. Number of plants per plot and cobs harvested were also showing statistically significant differences.
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**Table 63: Results of Hybrid Maize Micro Yield Trial-2 (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha | Days to 50% tassel | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1365 | 8996a | 74 | 77 | 146 | 72 | 42 | 47 |
| 2 | FH-1360 | 8941a | 74 | 77 | 167 | 81 | 44 | 45 |
| 3 | FH-1312 | 8845a | 71 | 73 | 156 | 86 | 42 | 37 |
| 4 | FH-1322 | 8516ab | 72 | 74 | 165 | 93 | 45 | 44 |
| 5 | FH-1352 | 8460ab | 71 | 73 | 167 | 87 | 48 | 45 |
| 6 | FH-1337 | 8184abc | 73 | 75 | 168 | 101 | 45 | 39 |
| 7 | FH-1295 | 8178abc | 71 | 73 | 148 | 71 | 44 | 41 |
| 8 | FH-1330 | 8122abc | 71 | 73 | 165 | 85 | 43 | 47 |
| 9 | FH-1366 | 8095abc | 74 | 76 | 161 | 85 | 46 | 45 |
| 10 | FH-1362 | 7896abcd | 71 | 73 | 152 | 75 | 47 | 45 |
| 11 | FH-1344 | 7728abcd | 73 | 75 | 164 | 88 | 46 | 45 |
| 12 | FH-1304 | 7271abcd | 73 | 75 | 151 | 82 | 43 | 41 |
| 13 | FH-1319 | 6768abcde | 71 | 73 | 165 | 95 | 42 | 42 |
| 14 | FH-1341 | 6140bcde | 74 | 76 | 165 | 78 | 48 | 46 |
| 15 | FH-1303 | 5922cde | 73 | 75 | 160 | 71 | 40 | 40 |
| 16 | NK-8441 (C ) | 5590de | 75 | 78 | 141 | 61 | 47 | 47 |
| 17 | DK-6724 (C ) | 4389e | 74 | 76 | 140 | 61 | 44 | 43 |
| | CV% | 15.28 | 1.14 | 1.21 | 4.73 | 7.76 | 5.35 | 13.83 |
| | LSD 5% | 2440 | 1.75 | 1.90 | 15.79 | 13.22 | NS | NS |

Data presented in the above table reveals the significant differences in mean grain yields due to hybrid varieties. Local hybrid FH-1365 gave the maximum grain yield of 8996 kg/ha. All other local hybrids were also statistically significantly higher yielder than commercial check hybrids NK-8441(5590 kg/ha) and DK-6724 (4389 kg/ha). Mid to high cob bearing trend was observed in most of the hybrids. Differences in plant height and cob height were also significant. The maximum plant height (168 cm) was shown by FH-1337 while the minimum plant height (140 cm) was observed for the commercial check DK-6724. Statistically significant differences were also observed for number of plants per plot and cobs harvested.

### 4. Hybrid Maize Preliminary Yield Trial (Spring 2017)

This trial comprised of three sets each consisting of twenty-nine single cross hybrids including two commercial hybrids as check were sown on 21-02-2017. The trials were laid out in RCB design with three replications. The plot size was kept 5m x 0.75m. The harvesting was done on 22-06-2016. Data regarding different agronomic traits were recorded and hybrids with good performance were selected for on farm testing. The data are given in Tables given below:

**Table 64: Results of Hybrid Maize Preliminary Yield Trial-1 (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1442 | 10132 | 71 | 73 | 156 | 83 | 25 | 34 |
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|---|---|---|---|---|---|---|---|---|
| 2 | FH-1427 | 8964 | 71 | 73 | 170 | 95 | 24 | 27 |
| 3 | FH-1448 | 8932 | 70 | 73 | 160 | 85 | 24 | 25 |
| 4 | FH-1443 | 8521 | 71 | 73 | 160 | 92 | 25 | 21 |
| 5 | FH-1447 | 8340 | 71 | 72 | 161 | 95 | 25 | 23 |
| 6 | FH-1432 | 8160 | 70 | 73 | 161 | 78 | 26 | 24 |
| 7 | FH-1438 | 8130 | 70 | 72 | 156 | 73 | 25 | 24 |
| 8 | FH-1436 | 8009 | 70 | 72 | 154 | 74 | 25 | 28 |
| 9 | FH-1440 | 7682 | 71 | 73 | 159 | 83 | 24 | 21 |
| 10 | FH-1433 | 7681 | 70 | 72 | 167 | 84 | 25 | 25 |
| 11 | FH-1429 | 7489 | 72 | 75 | 170 | 90 | 24 | 25 |
| 12 | FH-1428 | 7370 | 72 | 74 | 159 | 88 | 25 | 26 |
| 13 | FH-1446 | 7306 | 67 | 70 | 157 | 75 | 24 | 23 |
| 14 | FH-1424 | 7281 | 71 | 73 | 161 | 92 | 25 | 22 |
| 15 | FH-1431 | 6952 | 71 | 73 | 163 | 85 | 25 | 20 |
| 16 | FH-1439 | 6938 | 71 | 73 | 173 | 93 | 25 | 20 |
| 17 | DK-6724 (C) | 6894 | 69 | 72 | 152 | 78 | 25 | 21 |
| 18 | FH-1435 | 6783 | 69 | 72 | 155 | 87 | 26 | 22 |
| 19 | FH-1430 | 6639 | 71 | 73 | 165 | 83 | 24 | 18 |
| 20 | FH-1441 | 6542 | 70 | 72 | 156 | 79 | 25 | 19 |
| 21 | FH-1445 | 6542 | 68 | 71 | 155 | 76 | 25 | 19 |
| 22 | FH-1444 | 6511 | 69 | 72 | 143 | 75 | 25 | 23 |
| 23 | FH-1449 | 6302 | 71 | 73 | 174 | 88 | 25 | 22 |
| 24 | FH-1426 | 6048 | 70 | 72 | 172 | 92 | 24 | 21 |
| 25 | FH-1425 | 5727 | 70 | 72 | 161 | 84 | 24 | 18 |
| 26 | FH-1434 | 5644 | 71 | 73 | 173 | 79 | 25 | 20 |
| 27 | FH-1437 | 5107 | 72 | 75 | 153 | 86 | 25 | 19 |
| 28 | FH-1423 | 4713 | 71 | 73 | 128 | 74 | 17 | 17 |
| 29 | NK-8441 (C) | 4620 | 72 | 73 | 150 | 74 | 25 | 16 |
| | CV% | 20.02 | 0.64 | 1.24 | 4.06 | 4.65 | 2.87 | 19.91 |
| | LSD 5% | NS | 0.91 | 1.83 | 6.47 | 7.29 | NS | NS |

The data given in Table 64 showed statistically non-significant differences in grain yield kg/ha for the hybrids included in this trial. Local hybrid FH-1442 was the higher grain yield (10132 kg/ha) followed by the local hybrids FH-1427 (8964 kg/ha), FH-1448 (8964 kg/ha), FH-1443 (8964 kg/ha) and FH-1447 (8964 kg/ha). Results for No. of days to 50% tasseling and 50% silking showed statistically significant differences. Local hybrid FH-1446 showed earliness taking minimum days to complete 50% tasseling (67) and 50% silking (70). Significant differences were observed for plant height and cob height. Local hybrid FH-1449 attained maximum plant height (174 cm). Minimum cob height 73 cm of local hybrid FH-1438 was observed. Many local hybrids were showing mid to low bearing cobs which is a desirable character in developing lodging resistant hybrids. Results for No. of plants harvested and No. of cobs harvested were also showing significant differences.
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**Table 65: Results of Hybrid Maize Preliminary Yield Trial-2 (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs/ plot harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1472 | 10551a | 72 | 74 | 155 | 75 | 25 | 22 |
| 2 | FH-1475 | 10194ab | 73 | 76 | 175 | 74 | 25 | 25 |
| 3 | FH-1454 | 10064ab | 73 | 75 | 172 | 97 | 25 | 20 |
| 4 | FH-1451 | 9274abc | 72 | 74 | 176 | 91 | 24 | 26 |
| 5 | FH-1460 | 9157abc | 75 | 77 | 150 | 72 | 24 | 23 |
| 6 | FH-1453 | 8875abcd | 73 | 75 | 182 | 97 | 23 | 24 |
| 7 | FH-1456 | 8326bcde | 74 | 76 | 156 | 82 | 22 | 20 |
| 8 | FH-1464 | 8288bcdef | 75 | 77 | 146 | 80 | 24 | 24 |
| 9 | FH-1458 | 8083bcdef | 74 | 76 | 166 | 91 | 23 | 25 |
| 10 | FH-1463 | 7849cdefg | 74 | 76 | 148 | 68 | 24 | 22 |
| 11 | FH-1461 | 7795cdefg | 74 | 76 | 145 | 73 | 24 | 24 |
| 12 | FH-1459 | 7719cdefgh | 73 | 76 | 162 | 74 | 24 | 21 |
| 13 | FH-1450 | 7653cdefgh | 72 | 74 | 148 | 77 | 26 | 23 |
| 14 | FH-1466 | 7522cdefgh | 74 | 75 | 143 | 81 | 25 | 23 |
| 15 | NK-8441(C ) | 7477cdefgh | 72 | 74 | 147 | 62 | 22 | 19 |
| 16 | FH-1457 | 7435cdefghi | 75 | 77 | 149 | 80 | 24 | 21 |
| 17 | FH-1455 | 7119cdefghi | 76 | 78 | 189 | 101 | 25 | 17 |
| 18 | FH-1465 | 6946defghij | 74 | 76 | 151 | 74 | 25 | 24 |
| 19 | FH-1474 | 6894defghij | 75 | 79 | 163 | 89 | 12 | 21 |
| 20 | FH-1452 | 6688efghijk | 74 | 76 | 169 | 78 | 24 | 22 |
| 21 | FH-1471 | 6414efghijk | 73 | 75 | 153 | 79 | 22 | 21 |
| 22 | FH-1470 | 6287efghijk | 70 | 73 | 143 | 70 | 18 | 21 |
| 23 | FH-1468 | 6153fghijk | 75 | 78 | 127 | 62 | 25 | 24 |
| 24 | FH-1462 | 5922ghijk | 77 | 79 | 134 | 63 | 24 | 23 |
| 25 | FH-1473 | 5620hijk | 78 | 80 | 160 | 76 | 20 | 20 |
| 26 | FH-1476 | 5306ijk | 75 | 77 | 158 | 79 | 25 | 24 |
| 27 | FH-1467 | 4833jk | 74 | 76 | 114 | 48 | 25 | 21 |
| 28 | DK-6724 (C) | 4822jk | 73 | 75 | 142 | 61 | 21 | 16 |
| 29 | FH-1469 | 4565k | 76 | 78 | 131 | 65 | 7 | 7 |
| | CV (%) | 14.30 | 0.99 | 0.72 | 1.63 | 3.10 | 1.33 | 1.29 |
| | LSD 5% | 2159 | 1.49 | 1.12 | 5.11 | 4.84 | 2.82 | 4.90 |

The data presented in the Table 65 shows significant differences in grain yield statistically. Local hybrid FH-1472 gave the highest grain yield of 10551 kg/ha followed by FH-1475 (10194 kg/ha), FH-1454 (10064 kg/ha), FH-1451 (9274 kg/ha), FH-1460 (9157 kg/ha) and FH-1453 (8875 kg/ha) which were at par with the top yielding hybrid and statistically higher grain yielder than both the commercial checks NK-8441 (7477 kg/ha) and DK-6724 (4822 kg/ha). Days to 50% tasseling and 50% silking were also showing statistically significant differences. FH-1473 took the maximum days to complete 50% tasseling (78) and 50% silking (80) respectively, while FH-1470 took the minimum days (70) to complete 50% tasseling and 73 days to complete 50% silking. Mid to low bearing cob trend was apparent in most of the hybrid present in the trial. Significant differences were observed for plant height and cob height. Maximum plant height was attained by FH-
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1455(189 cm) while FH-1467 attained minimum plant height (114 cm). Mid to low cob bearing Number of plants and cobs harvested per plot were also showing statistically significant differences.

**Table 66: Results of Hybrid Maize Preliminary Yield Trial-3 (Spring 2017), Faisalabad.**

| Sr. No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs/ plot harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1486 | 6430 | 76 | 77 | 130 | 63 | 6 | 5 |
| 2 | FH-1492 | 5208 | 78 | 80 | 133 | 52 | 15 | 16 |
| 3 | FH-1484 | 4631 | 78 | 79 | 154 | 71 | 13 | 14 |
| 4 | FH-1501 | 4507 | 78 | 80 | 86 | 46 | 18 | 17 |
| 5 | FH-1495 | 4496 | 76 | 77 | 144 | 66 | 21 | 19 |
| 6 | FH-1482 | 4384 | 78 | 80 | 148 | 68 | 17 | 16 |
| 7 | DK-6724 (C ) | 4179 | 73 | 75 | 135 | 52 | 13 | 13 |
| 8 | FH-1487 | 3917 | 77 | 79 | 129 | 46 | 13 | 14 |
| 9 | FH-1498 | 3897 | 78 | 79 | 129 | 60 | 13 | 13 |
| 10 | FH-1503 | 3835 | 75 | 77 | 138 | 69 | 17 | 17 |
| 11 | FH-1481 | 3794 | 76 | 78 | 160 | 77 | 12 | 12 |
| 12 | FH-1480 | 3735 | 76 | 78 | 135 | 68 | 15 | 14 |
| 13 | FH-1497 | 3546 | 75 | 77 | 132 | 61 | 11 | 10 |
| 14 | FH-1496 | 3541 | 74 | 76 | 138 | 73 | 12 | 11 |
| 15 | FH-1502 | 3465 | 77 | 79 | 130 | 54 | 13 | 10 |
| 16 | NK-8441 (C ) | 3439 | 73 | 75 | 143 | 71 | 18 | 19 |
| 17 | FH-1478 | 3388 | 75 | 77 | 139 | 67 | 13 | 13 |
| 18 | FH-1479 | 3388 | 75 | 77 | 139 | 63 | 12 | 12 |
| 19 | FH-1488 | 3284 | 76 | 78 | 94 | 44 | 12 | 13 |
| 20 | FH-1494 | 3178 | 75 | 77 | 142 | 63 | 13 | 12 |
| 21 | FH-1477 | 3038 | 73 | 77 | 159 | 85 | 9 | 8 |
| 22 | FH-1499 | 2727 | 77 | 78 | 131 | 72 | 17 | 15 |
| 23 | FH-1483 | 2598 | 77 | 79 | 118 | 53 | 10 | 9 |
| 24 | FH-1493 | 2561 | 78 | 80 | 138 | 72 | 12 | 12 |
| 25 | FH-1491 | 2536 | 78 | 79 | 118 | 54 | 11 | 10 |
| 26 | FH-1485 | 2369 | 78 | 80 | 118 | 50 | 8 | 7 |
| 27 | FH-1500 | 2189 | 77 | 79 | 66 | 31 | 14 | 14 |
| 28 | FH-1490 | 1884 | 77 | 79 | 82 | 43 | 11 | 11 |
|  | FH-1489 | 1672 | 74 | 76 | 140 | 61 | 10 | 9 |
| CV (%) |  | 51.26 | 0.81 | 0.72 | 3.37 | 5.96 | 4.57 | 11.29 |
| LSD 5% |  | 2160 | 1.26 | 1.11 | 8.91 | 7.36 | 6.03 | 4.90 |

The data presented in the Table 66 shows statistically non-significant differences in grain yield due to hybrids. Local hybrid FH-1486 gave the highest grain yield of 6430 kg/ha followed by FH-1492 (5208 kg/ha). Days to 50% tasseling and 50% silking were showing statistically significant differences. Significant differences were observed for plant height and cob height. Maximum plant height was attained by FH-1481 (160 cm) while FH-1500
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attained minimum plant height (66 cm). Number of plants and cobs harvested per plot were also showing statistically significant differences.

### 5. National Uniform Hybrid Maize Yield Trial No. 1 (Spring 2017)

This trial comprised of sixty four (64) entries was sown on 28-12-2017. The trial was laid out in RCB design with three replications. The plot size was kept 5m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting was done on 23-06-16. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in the following Table 21.

**Table 67: Results of National Uniform Hybrid Maize (Yellow) Yield (Spring2017), Faisalabad**

| Sr. No. | Entry | Grain Yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | AC | 7345 | 69 | 71 | 163 | 72 | 45 | 40 |
| 2 | AD | 7343 | 68 | 70 | 132 | 68 | 46 | 47 |
| 3 | AV | 6994 | 68 | 70 | 108 | 58 | 43 | 41 |
| 4 | AF | 6994 | 67 | 69 | 114 | 56 | 46 | 45 |
| 5 | AX | 6712 | 68 | 71 | 99 | 59 | 21 | 19 |
| 6 | AE | 6542 | 69 | 71 | 115 | 55 | 43 | 44 |
| 7 | AU | 6373 | 67 | 68 | 126 | 62 | 38 | 37 |
| 8 | F | 6197 | 68 | 70 | 149 | 53 | 40 | 39 |
| 9 | AT | 6167 | 67 | 68 | 129 | 65 | 40 | 38 |
| 10 | BL | 6070 | 70 | 72 | 119 | 56 | 36 | 34 |
| 11 | Y | 5696 | 71 | 73 | 128 | 58 | 35 | 34 |
| 12 | I | 5584 | 70 | 72 | 113 | 52 | 33 | 31 |
| 13 | B | 5527 | 68 | 70 | 137 | 56 | 34 | 33 |
| 14 | AS | 5358 | 68 | 70 | 149 | 69 | 31 | 29 |
| 15 | D | 5302 | 68 | 70 | 147 | 58 | 34 | 31 |
| 16 | AA | 5189 | 68 | 70 | 166 | 77 | 31 | 29 |
| 17 | BK | 5076 | 70 | 72 | 105 | 53 | 30 | 28 |
| 18 | AO | 5054 | 69 | 71 | 114 | 56 | 32 | 30 |
| 19 | A | 5020 | 69 | 71 | 144 | 64 | 41 | 38 |
| 20 | Z | 4990 | 71 | 73 | 131 | 62 | 33 | 32 |
| 21 | AH | 4960 | 67 | 69 | 99 | 55 | 42 | 40 |
| 22 | G | 4907 | 66 | 68 | 110 | 58 | 40 | 36 |
| 23 | AI | 4907 | 69 | 72 | 119 | 62 | 37 | 35 |
| 24 | E | 4901 | 69 | 72 | 166 | 65 | 36 | 34 |
| 25 | J | 4794 | 74 | 75 | 126 | 66 | 39 | 37 |
| 26 | BC | 4681 | 71 | 73 | 91 | 48 | 26 | 25 |
| 27 | AY | 4625 | 70 | 72 | 127 | 63 | 34 | 33 |
| 28 | L | 4568 | 70 | 72 | 134 | 56 | 32 | 31 |
| 29 | AJ | 4512 | 68 | 69 | 123 | 63 | 31 | 29 |
| 30 | BG | 4456 | 69 | 71 | 115 | 56 | 32 | 31 |
| 31 | BD | 4343 | 69 | 71 | 101 | 54 | 30 | 28 |
| 32 | AB | 4286 | 68 | 70 | 150 | 69 | 34 | 33 |
| 33 | BA | 4230 | 69 | 71 | 120 | 65 | 33 | 31 |
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|---|---|---|---|---|---|---|---|---|
| 34 | BH | 4230 | 72 | 74 | 119 | 63 | 33 | 32 |
| 35 | AK | 4004 | 69 | 71 | 129 | 67 | 31 | 29 |
| 36 | W | 3953 | 70 | 73 | 173 | 76 | 35 | 34 |
| 37 | BB | 3948 | 71 | 73 | 100 | 52 | 27 | 26 |
| 38 | AG | 3948 | 67 | 69 | 136 | 55 | 28 | 26 |
| 39 | M | 3835 | 69 | 71 | 134 | 64 | 30 | 29 |
| 40 | AP | 3666 | 69 | 71 | 122 | 64 | 31 | 30 |
| 41 | K | 3271 | 71 | 72 | 98 | 58 | 35 | 33 |
| 42 | C | 3158 | 69 | 71 | 130 | 58 | 31 | 28 |
| 43 | BJ | 3155 | 68 | 70 | 115 | 63 | 32 | 30 |
| 44 | X | 3102 | 71 | 73 | 162 | 83 | 33 | 32 |
| 45 | AR | 2950 | 67 | 70 | 116 | 54 | 27 | 26 |
| 46 | V | 2876 | 70 | 72 | 160 | 69 | 27 | 25 |
| 47 | AN | 2876 | 68 | 70 | 121 | 62 | 28 | 26 |
| 48 | AQ | 2820 | 67 | 70 | 76 | 47 | 19 | 18 |
| 49 | AZ | 2764 | 69 | 71 | 137 | 65 | 25 | 24 |
| 50 | O | 2643 | 75 | 77 | 90 | 51 | 27 | 25 |
| 51 | AM | 2594 | 67 | 68 | 116 | 62 | 24 | 23 |
| 52 | BE | 2482 | 68 | 70 | 116 | 63 | 17 | 15 |
| 53 | Q | 2482 | 74 | 76 | 148 | 65 | 23 | 21 |
| 54 | AL | 2369 | 69 | 70 | 136 | 68 | 26 | 24 |
| 55 | BI | 2369 | 70 | 72 | 161 | 65 | 18 | 17 |
| 56 | N | 2200 | 74 | 74 | 127 | 68 | 20 | 17 |
| 57 | U | 2030 | 70 | 72 | 80 | 43 | 21 | 19 |
| 58 | AW | 1974 | 67 | 69 | 121 | 62 | 20 | 19 |
| 59 | H | 1918 | 70 | 72 | 88 | 42 | 21 | 19 |
| 60 | BF | 1692 | 72 | 74 | 152 | 64 | 14 | 12 |
| 61 | S | 1636 | 68 | 70 | 112 | 60 | 22 | 20 |
| 62 | T | 1579 | 69 | 71 | 128 | 63 | 21 | 20 |
| 63 | P | 1297 | 68 | 70 | 114 | 66 | 18 | 17 |
| 64 | R | 1064 | 67 | 69 | 130 | 64 | 14 | 13 |
| CV% | | 48.53 | 0.67 | 0.53 | 3.46 | 4.28 | 31.91 | 36.16 |
| LSD 5% | | NS | 0.92 | 0.75 | 8.63 | 5.18 | NS | NS |

Data presented in Table 67 revealed that statistically non-significant differences exist for grain yield kg/ha among entries included in this trial. Entry AC gave maximum grain yield of 7345 kg/ha followed by entry AD (7343 kg/ha). Entry R was lower yielder with grain yield 1064 kg/ha at this station. Statistically significant differences were observed for days to 50% tasseling 50% silking, plant height, cob height but non-significant for No. of plants and cobs harvested.

### 6. National Uniform Hybrid Maize Yield Trial (WHITE) (Spring 2017), Faisalabad.

This trial was sown on 28-02-16 with six entries. The trial was laid out in RCB design with two replications. The plot size was kept 5m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 23-06-16. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table 68.
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**Table 68: Results of National Uniform Hybrid Maize (White) Yield (Spring 2017), Faisalabad**

| Rank. No. | Entry | Grain Yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | E | 2672 | 72 | 72 | 118 | 52 | 16 | 15 |
| 2 | A | 2253 | 72 | 74 | 133 | 73 | 20 | 19 |
| 3 | D | 2052 | 71 | 74 | 113 | 49 | 9 | 8 |
| 4 | C | 1270 | 73 | 75 | 114 | 36 | 9 | 9 |
| 5 | B | 903 | 72 | 73 | 117 | 41 | 6 | 6 |
| 6 | F | 894 | 71 | 73 | 94 | 43 | 5 | 6 |
| CV% | | 46.83 | 4.39 | 2.01 | 1.46 | 4.98 | 43.90 | 94.30 |
| LSD 5% | | NS | NS | NS | 4.30 | 6.23 | NS | NS |

Data presented in Table 68 showed significant differences for grain yield kg/ha due to varieties. The Entry coded as E out yielded with grain yield 2672 kg/ha followed by A (2253 kg/ha). Entry F was lower yielder with grain yield 894 kg/ha. Statistically significant differences were also observed for days to complete 50% tasseling and 50% silking. The traits plant height and cob height, number of plants per plot and cobs harvested were also showing significant differences in this trial.

### 7. National Uniform Varietal Maize Yield Trial (Spring 2017)

This trial was sown on 28-02-2017 with thirteen entries. The trial was laid out in RCB design with two replications. The plot size was kept 5m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 23-06-16. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table 69.

**Table 23: Results of National Uniform Varietal Maize Yield (Spring 2017), Faisalabad**

| Rank. No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | M | 2482 | 70 | 73 | 131 | 54 | 18 | 17 |
| 2 | D | 2360 | 69 | 72 | 119 | 74 | 18 | 17 |
| 3 | B | 2271 | 68 | 71 | 150 | 91 | 17 | 16 |
| 4 | I | 2030 | 67 | 71 | 106 | 47 | 15 | 14 |
| 5 | J | 1918 | 69 | 72 | 136 | 59 | 13 | 13 |
| 6 | K | 1881 | 66 | 69 | 151 | 66 | 13 | 12 |
| 7 | C | 1859 | 65 | 68 | 131 | 66 | 15 | 14 |
| 8 | A | 1742 | 67 | 70 | 150 | 93 | 11 | 9 |
| 9 | F | 1334 | 68 | 71 | 89 | 40 | 14 | 13 |
| 10 | G | 1207 | 69 | 72 | 116 | 57 | 11 | 10 |
| 11 | H | 1007 | 68 | 71 | 134 | 69 | 12 | 12 |
| 12 | L | 959 | 71 | 74 | 146 | 71 | 7 | 6 |
| 13 | E | 805 | 71 | 74 | 128 | 67 | 5 | 5 |
| CV% | | 64.78 | 0.99 | 0.87 | 5.60 | 6.23 | 22.39 | 72.08 |
| LSD 5% | | NS | 1.45 | 1.33 | 15.79 | 8.88 | NS | NS |
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Data presented in Table 69 showed non-significant differences for grain yield kg/ha due to varieties. The Entry coded as M out yielded with grain yield 2482 kg/ha followed by D (2360 kg/ha). Entry E was lower yielder with grain yield 805 kg/ha. Statistically significant differences were observed for days to complete 50% tasseling, 50% silking, plant height and cob height. The traits, number of plants per plot and cobs harvested were non-significant in this trial.

**8. National Uniform Varietal (Sweet Corn) Maize Yield Trial (Spring 2017)**

This trial was sown on 28-02-2017 with six entries. The trial was laid out in RCB design with two replications. The plot size was kept 5m x 1.5m. Standard agronomic and plant protection measures were carried out in the crop. Harvesting of trial was done on 23-06-16. Data regarding different traits were recorded and elite hybrids were selected for further evaluation. The data are given in Table 70.

**Table 70: Results of National Uniform Varietal (Sweet Corn) Maize Yield (Spring 2017), Faisalabad**

| Rank. No. | Entry | Grain yield kg/ha. | Days to 50% tassel. | Days to 50% silk | Plant Ht. Cm. | Cob Ht. Cm. | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | E | 1234 | 72 | 74 | 62 | 44 | 10 | 9 |
| 2 | F | 1128 | 71 | 73 | 119 | 67 | 23 | 12 |
| 3 | C | 1127 | 69 | 72 | 89 | 35 | 10 | 8 |
| 4 | B | 1097 | 73 | 75 | 115 | 37 | 16 | 15 |
| 5 | A | 1092 | 74 | 76 | 54 | 22 | 6 | 5 |
| 6 | D | 1073 | 70 | 72 | 97 | 50 | 14 | 15 |
| CV% | | 8.41 | 0.51 | 0.79 | 15.64 | 36.31 | 29.48 | 59.10 |
| LSD 5% | | NS | 0.93 | 1.48 | 35.73 | NS | NS | NS |

Data presented in Table 70 showed non-significant differences for grain yield kg/ha due to varieties. The Entry coded as E out yielded with grain yield 1234 kg/ha followed by F (1128 kg/ha). Entry D was lower yielder with grain yield 1073 kg/ha. Statistically significant differences were observed for days to complete 50% tasseling, 50% silking and plant height. The traits cob height, number of plants per plot and cobs harvested were showing non-significant differences in this trial.

**9. ADP Project "Provision of Additional Research Facilities for Development of Heat Resilient Maize Hybrids at Maize and Millets Research Institute"**

**A. Screening of Heat Resilient Maize Inbred Lines**

One set of sixty four (64) maize inbred lines sown in tunnel under controlled conditions were exposed to heat stress by maintaining high temperature inside during flowering and pollination stage (Month of May) for further evaluation and screening for heat stress tolerance. Following Avg. weekly temperature data were recorded inside and outside the tunnel.

**Table 71: Average weekly temperature data of tunnel**

| Week of Month May 2017 | Average weekly Temperature outside $^{o}$C | Average weekly Temperature inside $^{o}$C |
|---|---|---|
| 1$^{st}$ | 40.5 | 43.6 |
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| | | |
|---|---|---|
| 2nd | 41.7 | 45.1 |
| 3rd | 42 | 45.9 |
| 4th | 41 | 44.5 |

At this temperature stress the performance of inbred lines was observed as follows:

**Table 72: Stress performance of inbred lines**

| Tolerance level | Seed setting % | Inbred lines |
|---|---|---|
| Resistant | 100 | - |
| Moderately resistant | Above 75 | - |
| Tolerant | Above 50 | F-308, F-282, F-271, F-243, F-210, F-165 |
| Moderately tolerant | 20-50 | F-123, F-132, F-166, F-355, F-367, F-385 |
| Susceptible | Less than 20 | F-202, F-247, F-252, F-265, F-281, F-290, F-314, F-342, F-356, F-357 and F-359 |

## B. EVALUATION OF HYBRIDS IN PRELIMINARY YIELD TRIALS

### I. Hybrid Maize Preliminary Yield Trial No. 1 (Spring 2017)

This trial comprised of two sets each consisting of twenty-nine single cross hybrids including two commercial hybrids as check were sown on 21-02-2017. The trials were laid out in RCB design with three replications. The plot size was kept 5m x 0.75m. The harvesting was done on 22-06-2016. Data regarding different agronomic traits were recorded and hybrids with good performance were selected for on farm testing. The data are given in Tables given below:

**Table 73: Results of Hybrid Maize Preliminary Yield Trial-1, ADP-Project (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1371 | 13467 | 73 | 75 | 170 | 81 | 28 | 28 |
| 2 | FH-1372 | 13467 | 69 | 71 | 203 | 111 | 25 | 26 |
| 3 | FH-1381 | 12933 | 72 | 74 | 175 | 98 | 25 | 25 |
| 4 | FH-1390 | 11867 | 71 | 73 | 182 | 108 | 26 | 26 |
| 5 | FH-1382 | 11467 | 72 | 74 | 171 | 92 | 25 | 25 |
| 6 | FH-1393 | 10667 | 74 | 76 | 174 | 85 | 26 | 26 |
| 7 | FH-1369 | 10667 | 74 | 77 | 147 | 80 | 20 | 19 |
| 8 | FH-1370 | 10667 | 70 | 72 | 174 | 88 | 25 | 25 |
| 9 | FH-1392 | 10667 | 73 | 76 | 179 | 90 | 24 | 24 |
| 10 | FH-1376 | 10533 | 72 | 74 | 179 | 92 | 23 | 23 |
| 11 | FH-1377 | 10400 | 71 | 73 | 172 | 80 | 18 | 18 |
| 12 | FH-1375 | 10267 | 71 | 73 | 179 | 88 | 18 | 18 |
| 13 | FH-1391 | 10267 | 71 | 74 | 165 | 68 | 25 | 25 |
| 14 | FH-1394 | 10267 | 75 | 77 | 178 | 90 | 22 | 22 |
| 15 | FH-1373 | 10267 | 73 | 76 | 184 | 110 | 22 | 22 |
| 16 | FH-1395 | 10133 | 73 | 75 | 184 | 90 | 23 | 23 |
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|---|---|---|---|---|---|---|---|---|
| 17 | FH-1386 | 10000 | 74 | 76 | 178 | 91 | 25 | 24 |
| 18 | FH-1385 | 9867 | 70 | 72 | 172 | 72 | 24 | 24 |
| 19 | FH-1384 | 9733 | 71 | 74 | 185 | 99 | 24 | 24 |
| 20 | NK-8441 (C ) | 9467 | 71 | 73 | 176 | 82 | 20 | 20 |
| 21 | FH-1383 | 9333 | 71 | 73 | 170 | 83 | 28 | 28 |
| 22 | FH-1379 | 9200 | 72 | 74 | 158 | 70 | 18 | 18 |
| 23 | FH-1387 | 9067 | 73 | 76 | 181 | 92 | 25 | 25 |
| 24 | FH-1374 | 9067 | 70 | 72 | 166 | 82 | 22 | 22 |
| 25 | FH-1389 | 8933 | 71 | 73 | 175 | 83 | 25 | 25 |
| 26 | FH-1388 | 8667 | 71 | 74 | 193 | 94 | 21 | 21 |
| 27 | DK-6724 (C ) | 8533 | 71 | 73 | 161 | 62 | 21 | 21 |
| 28 | FH-1380 | 3867 | 74 | 76 | 124 | 56 | 12 | 12 |
| 29 | FH-1378 | 3733 | 76 | 78 | 110 | 58 | 15 | 15 |
| CV% | | 16.26 | 0.85 | 1.02 | 0.76 | 1.45 | 8.62 | 13.33 |
| LSD 5% | | 3301.6 | 1.24 | 1.54 | 2.65 | 2.52 | 3.74 | 6.10 |

The data given in Table 73 showed statistically non-significant differences in grain yield kg/ha for hybrids included in this trial. Local hybrid FH-1371 gave highest grain yield (13467 kg/ha) followed by local hybrids FH-1372, FH-1381, FH-1390, FH-1382, FH-1393 and FH-1369. Local hybrid FH-1372 showed earliness taking minimum days to complete 50% tasseling (69) and 50% silking (71). Significant differences were observed for plant height and cob height. Local hybrid FH-1372 attained maximum plant height (203 cm). Minimum cob height 62 cm of commercial check DK-6734 was observed. Mid to low cob bearing is a desirable character and is helpful in developing lodging resistant hybrids. Results for No. of plants harvested and No. of cobs harvested were showing significant differences.

**Table 74: Results of Hybrid Maize Preliminary Yield Trial-II, ADP-Project (Spring 2017), Faisalabad**

| Sr. No. | Entry | Grain yield kg/ha | Days to 50% tassel. | Days to 50% silk | Plant Height (cm) | Cob Height (cm) | No. of plants harv. | No. of cobs harv. |
|---|---|---|---|---|---|---|---|---|
| 1 | FH-1411 | 10092 | 74 | 75 | 173 | 96 | 26 | 26 |
| 2 | FH-1414 | 10056 | 72 | 73 | 173 | 82 | 27 | 22 |
| 3 | NK-8441 (C ) | 9263 | 72 | 74 | 162 | 84 | 26 | 26 |
| 4 | FH-1412 | 9018 | 75 | 77 | 178 | 95 | 27 | 24 |
| 5 | FH-1415 | 8932 | 71 | 72 | 149 | 61 | 27 | 25 |
| 6 | FH-1408 | 8856 | 74 | 75 | 177 | 85 | 27 | 25 |
| 7 | FH-1410 | 8842 | 75 | 77 | 172 | 74 | 26 | 25 |
| 8 | FH-1417 | 8552 | 71 | 72 | 160 | 74 | 27 | 25 |
| 9 | FH-1418 | 8390 | 74 | 77 | 161 | 81 | 27 | 27 |
| 10 | FH-1400 | 8380 | 74 | 77 | 181 | 84 | 26 | 23 |
| 11 | FH-1399 | 8357 | 71 | 75 | 163 | 82 | 27 | 24 |
| 12 | FH-1397 | 7968 | 76 | 79 | 183 | 84 | 26 | 24 |
| 13 | FH-1419 | 7896 | 74 | 76 | 170 | 84 | 27 | 23 |
| 14 | FH-1407 | 7826 | 74 | 76 | 171 | 73 | 27 | 24 |
| 15 | FH-1416 | 7737 | 77 | 79 | 198 | 116 | 27 | 23 |
| 16 | FH-1413 | 7691 | 74 | 76 | 172 | 91 | 26 | 23 |
| 17 | FH-1420 | 7679 | 74 | 76 | 161 | 82 | 26 | 20 |
| 18 | FH-1398 | 7653 | 73 | 75 | 186 | 92 | 27 | 22 |
| 19 | FH-1403 | 7607 | 74 | 75 | 161 | 78 | 25 | 22 |
| 20 | FH-1401 | 7453 | 76 | 78 | 163 | 83 | 27 | 23 |
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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 21 | FH-1396 | 7225 | 75 | 76 | 153 | 70 | 27 | 24 |
| 22 | FH-1422 | 7098 | 72 | 76 | 168 | 78 | 27 | 21 |
| 23 | FH-1421 | 6997 | 72 | 74 | 162 | 82 | 25 | 22 |
| 24 | FH-1409 | 6985 | 77 | 78 | 172 | 82 | 25 | 20 |
| 25 | FH-1405 | 6669 | 75 | 78 | 169 | 79 | 27 | 23 |
| 26 | FH-1406 | 6629 | 76 | 78 | 149 | 73 | 27 | 20 |
| 27 | FH-1402 | 6588 | 75 | 78 | 176 | 89 | 24 | 20 |
| 28 | DK-6724 (C ) | 6041 | 72 | 73 | 152 | 64 | 25 | 21 |
| 29 | FH-1404 | 6013 | 76 | 78 | 164 | 92 | 26 | 24 |
| | CV% | 11.83 | 11.91 | 1.71 | 2.09 | 3.02 | 5.06 | 13.40 |
| | LSD 5% | 1909.9 | | 264 | 7.19 | 5.10 | | |

The data given in Table 74 showed statistically non-significant differences in grain yield kg/ha for hybrids included in this trial. Local hybrid FH-1411 gave highest grain yield (10092 kg/ha) followed by the local hybrids FH-1414 (10056 kg/ha) and commercial check NK-8441 with grain yield (9263 kg/ha). Other commercial check DK-6724 with grain yield (6041 kg/ha), exhibited, second last position with respect to this trait. Results for No. of days to 50% tasseling and 50% silking showed statistically significant differences. Significant differences were observed for plant height and cob height. Local hybrid FH-1416 attained maximum plant height (198 cm). Minimum cob height 61 cm of local hybrid FH-1415 was observed. Mid to low cob bearing is a desirable character and is helpful in developing lodging resistant hybrids. Results for No. of plants harvested and No. of cobs harvested were also showing significant differences.

II. **ON-FARM TESTING**

**Table 75: On Farm Hybrids Evaluation Trial Spring 2017 for heat stress tolerance Grain Yield (Kg/ ha)**

| R. No. | Entries | Ck. No 129 G.B Fsd | Mauza Gilmala, Jhang | Ck. No. 506 GB Kamalia road, Mamunkanjan | Chak No. 254 J.B, Jhang | PARS Farm, Faisalabad |
|---|---|---|---|---|---|---|
| 1 | FH-1046 | 11719 | 12524 | 11387 | 13689 | 7997 |
| 2 | YH-1898 | 9321 | 10284 | 9714 | 11488 | 8511 |
| 3 | DK-6724 | 8435 | 10080 | 7948 | 10272 | 6535 |
| 4 | NK-8711 | 8148 | 9379 | 8274 | 9970 | 6558 |
| 5 | FH-793 | 9864 | 10214 | 9156 | 10948 | 6655 |
| 6 | FH-988 | 10327 | 9819 | 9311 | 13821 | 7539 |
| 7 | FH-1292 | 10975 | 10719 | 10427 | 11767 | 7693 |
| 8 | P-1543 | 9132 | 9733 | 9521 | 10663 | 6952 |
| 9 | FH-949 | 11087 | 12182 | 11863 | 13377 | 8563 |

## 10. 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.
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**Table 76: Seed Production, (Spring-2017), Faisalabad**

| Sr. No. | Entry | Seed production (Kgs) |
|---|---|---|
| 1 | DTC | 932 |
| 2 | Malka-16 | 689 |

# MILLETS RESEARCH STATION, RAWALPINDI

## SEASON AND ITS EFFECT

Meteorological data of Millets Research Station, Rawalpindi for the financial year 2015-2016 and 2016-2017 are given below. During the year 2016-2017, 941.00 mm rain was received compared with 2015-2016 (1400.0mm). Heavy rains during the 1st week of July facilitated seed bed preparation and sowing of pearl millet (grain) yield trials. Dry spell from September to November 2016 caused early flowering and poor seed setting in Pearl millet. No rains received during the months from November to December 2016 and hence no rabi crop could be sown.

**Table 77: Meteorological Data for the Financial Year 2015-16 and 2016-17**

| Sr. No. | Month | Average Temperature $^{o}$C | | | | Rainfall (mm) | |
|---|---|---|---|---|---|---|---|
| | | Maximum | | Minimum | | | |
| | | (2015-16) | (2016-17) | (2015-16) | (2016-17) | (2015-16) | (2016-17) |
| 1 | July | 40.5 | 40 | 21.0 | 21.8 | 432.2 | 341.9 |
| 2 | August | 37.0 | 38 | 21.5 | 21.5 | 180.3 | 128 |
| 3 | September | 37.0 | 37 | 18.0 | 21.5 | 79.9 | 4.2 |
| 4 | October | 34.2 | 36.2 | 10.5 | 11.00 | 193.0 | 24.5 |
| 5 | November | 27.5 | 28.9 | 6.5 | 6.5 | 15.2 | 0.0 |
| 6 | December | 24.0 | 26.5 | 2.0 | 1.5 | 20.0 | 0.0 |
| 7 | January | 21.5 | 23.00 | 2.0 | 1.00 | 55.7 | 145.7 |
| 8 | February | 31.5 | 27.5 | 4.5 | 5.2 | 129.4 | 15.8 |
| 9 | March | 32.2 | 35.0 | 9.5 | 5.5 | 180.1 | 16.2 |
| 10 | April | 38.0 | 39.5 | 14.5 | 8.8 | 14.3 | 81.0 |
| 11 | May | 42.5 | 41.7 | 19.4 | 16.0 | 26.0 | 20.2 |
| 12 | June | 42.0 | 46.5 | 21.0 | 19.0 | 73.6 | 163.2 |
| **Total** | | | | | | **1399.7** | **940.7** |

## RESEARCH WORK DONE

Following research work on pearl millet and maize crops was conducted during the year 2016-17 at Millets Research Station, Rawalpindi.
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## PEARL MILLET

### 1. Crossing Block of Pearl Millet

Forty six pearl millet germplasm lines were sown on 20-07-2016 using strip design. Each genotype comprised of two rows of five meter length. Inter row and inter plant distances were kept as 75 cm and 20 cm respectively. Gape filling and thinning was done from 02-08-2016 to 04-08-2016. Forty four lines were maintained through hand pollination while two lines were discarded due to poor performance. Seed was harvested on 20-10-2016 and retained for future utilization in the breeding programme for the development of dual purpose variety.

Twenty successful fresh crosses were made, harvested and seed was retained for further evaluation during kharif- 2017.

### 2. Development of Dual Purpose Pearl Millet Variety

Five filial populations ($F_1$ $F_2$, $F_3$, $F_4$ and $F_5$) were sown on 20-07-2016 and using strips design. Plant to plant and row to row distances were kept as 20 cm and 75 cm respectively. Phenotypically vigorous plants from $F_1$ population were self-fertilized, harvested and seed was retained to raise $F_2$ population during kharif 2017. Superior heads were selected from all other populations considering the characters like days to 50% flowering, plant height, number of tillers/plant, panicle length, panicle girth, seed size and number of grains per panicle, to develop next population for further evaluation. Selected heads were harvested and seed was retained to grow and study next population during kharif 2017. The detail is given in Table 78.

**Table 78: Pearl millet populations studied during kharif- 2016**

| S. No. | Population | Studied | Selected | |
|---|---|---|---|---|
| | | | Crosses/Plants | Lines |
| 1 | $F_1$ | 20 | 20 crosses | - |
| 2 | $F_2$ | 20 | 20 plants | - |
| 3 | $F_3$ | 25 | 93 plants | 07 |
| 4 | $F_4$ | 16 | 29 plants | 03 |
| 5 | $F_5$ | 15 | 20plants | 08 |

Seven superior lines, considering the characters under study, were selected from $F_3$, three from $F_4$ and eight from $F_5$ Populations respectively for further evaluation in micro yield trial during kharif 2017.

### 3. Pearl Millet Micro Yield Trial -I

The trial, comprising of ten pearl millet genotypes was sown on 21-07-2016 using Randomized Complete Block Design with three replications. Each plot consisted of four rows of 5 meter length with row to row spacing of 75 cm and plant to plant spacing of 20 cm respectively. Gape filling/ thinning was done on 08-08-2016 to ensure required plant population. Harvesting was completed on 18-10-2016. The observations recorded on different plant parameters are summarized in Table 79.
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**Table 79: Results of Pearl Millet Micro Yield Trial –I, Kharif- 2016.**

| R. No. | Varieties | Plants Harvested | Grain Yield (kg/ha) | Days to 50%Flowering | Plant Height (cm) |
|---|---|---|---|---|---|
| 1. | 15RBS-07 | 83 | 2882a | 56 | 212 |
| 2. | 15RBS-03 | 83 | 2164b | 54 | 212 |
| 3. | 15RBS-05 | 84 | 2164b | 53 | 214 |
| 4. | 15RBS-08 | 86 | 1975c | 56 | 211 |
| 5. | 15RBS-02 | 82 | 1794d | 53 | 218 |
| 6. | 15RBS-01 | 81 | 1722d | 56 | 241 |
| 7. | 15RBS-06 | 84 | 1531e | 55 | 193 |
| 8. | 15RBS-04 | 88 | 1470e | 58 | 240 |
| 9. | 15RBS-09 | 81 | 1331f | 57 | 211 |
| 10. | YBS-98 (Check) | 81 | 1102g | 52 | 214 |
| | CV % | 4.36 | 2.35 | 2.56 | 3.80 |
| | LSD 1% | 8.57 | 100.30 | 3.30 | 19.74 |

Table 79 revealed highly significant genetic differences among genotypes for parameters like grain yield, days to 50% flowering and plant height except plant harvested. The genotype 15RBS-07 gave maximum grain yield (2882 kg/ha) followed by 15RBS-03 (2164 kg/ha). While check variety YBS-98 gave 1102kg/ha yield.

The check variety YBS-98 took minimum days (52days) to complete 50% flowering while maximum numbers of days (58days) were taken by the genotype 15RBS-04. Maximum height of 241 cm was attained by 15RBS-01 while minimum height (193cm) was recorded for 15RBS-06.

### 4. Pearl Millet Micro Yield Trial -II

The trial, comprising of eight pearl millet genotypes was sown on 21-07-2016 using Randomized Complete Block Design with three replications. Each plot consisted of four rows of 5 meter length with row to row spacing of 75 cm and plant to plant spacing of 20 cm respectively. Gape filling/ thinning was done on 08-08 2016 to ensure required plant population. Harvesting was completed on 17-10-2016. The observations recorded on different plant parameters are summarized in Table 80.

**Table 80: Results of Pearl Millet Micro Yield Trial- ii, Kharif, 2016**

| R. No. | Varieties | Plants Harvested | Grain Yield (kg/ha) | Days to 50%Flowering | Plant Height (cm) |
|---|---|---|---|---|---|
| 1. | 14RBS-05 | 81 | 2326a | 51 | 212 |
| 2. | 14RBS-01 | 85 | 2189ab | 52 | 232 |
| 3. | 14RBS-03 | 81 | 2165ab | 48 | 220 |
| 4. | 13RBS-11 | 86 | 1902bc | 49 | 218 |
| 5. | 14RBS-06 | 83 | 1762cd | 55 | 206 |
| 6. | 14RBS-02 | 82 | 1650cde | 51 | 232 |
| 7. | YBS-98 | 83 | 1575de | 49 | 212 |
| 8. | 14RBS-04 | 85 | 1421e | 50 | 227 |
| CV % | | 5.78 | 6.83 | 1.75 | 3.66 |
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| | | | | |
|---|---|---|---|---|
| LSD 1% | 11.69 | 311.03 | 2.14 | 19.53 |

Table 80 revealed highly significant genetic differences for parameters like grain yield, days to 50% flowering and plant height except plant harvested. The genotype 14RBS-05 gave maximum grain yield (2326 kg/ha) followed by 14RBS-01 (2189 kg/ha). While check variety YBS-98 gave 1575kg/ha grain yield.

Maximum number of days (55days) was taken by the genotype 14RBS-06 while minimum number of days (48days) to complete 50% flowering was taken by genotype 14 RBS-03. Maximum plant height of 232 cm was attained by14RBS-01while minimum height (212cm) was recorded for the check variety (YBS-98) and14RBS-05. The results clearly indicate that the top yielding genotype (14RBS-05) is medium statured and early maturing, hence best suits for Barani areas.

## 5. Pearl Millet Varietal Yield Trial

Ten 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 21-07-2016 according to Randomized Complete Block Design with three replications. The plot size was $15m^2$ with four rows of 5 meter length of each genotype. Row to row and plant to plant distances were kept as 75cm and 20 cm respectively. Thinning/gape filling through transplanting was done on 10-08-2016 which produced good effect on plant growth. The harvesting was completed on 26-10-2016. The data of various plant parameters were recorded and the summary of the results is presented in Table 81.

**Table 81: Results of Pearl Millet Varietal Yield Trial Kharif- 2016**

| R. No. | Entries | Plants Harvested | Grain Yield (kg/ha) | Days to 50% Flowering | Plant Height (cm) |
|---|---|---|---|---|---|
| 1. | YBS-98 | 86 | 2429a | 57 | 224 |
| 2. | YBS-93 | 91 | 1724b | 57 | 238 |
| 3. | YBS-89 | 87 | 1718b | 57 | 237 |
| 4. | YBS-94 | 83 | 1651bc | 56 | 232 |
| 5. | YBS-95 | 81 | 1621c | 57 | 213 |
| 6. | YBS-83 | 76 | 1563c | 55 | 235 |
| 7. | YBS-70 | 77 | 1329d | 58 | 248 |
| 8. | YBS-92 | 78 | 1317d | 56 | 219 |
| 9 | YBR-5 | 82 | 1179e | 54 | 247 |
| 10. | 18-BY | 80 | 1011 | 62 | 273 |
| CV % | | 3.48 | 2.53 | 2.30 | 1.52 |
| LSD 1% | | 6.71 | 92.30 | 3.07 | 8.47 |

Analysis of variance showed highly significant differences among genotypes for plant harvested, grain yield, days to 50% flowering and plant height characters. Table 5 revealed that genotype YBS-98 gave maximum grain yield of 2429 Kg/ha followed by YBS-93 (1724Kg/ha) whereas, minimum grain yield of 1011 Kg/ha was produced by 18-BY. Genotype YBR-5 took minimum number of days (54 days) to complete 50% flowering while genotype 18-BY took maximum numbers of days i.e. 64 days to complete 50%
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flowering. Regarding plant height, maximum plant height of 273 cm was recorded for genotype 18 BY followed by YBS-70 (248cm) while genotype YBS-95 exhibited minimum plant height (213cm).

## 6. Adaptability/National Uniform Millet Grain Yield Trial Kharif 2016

The experiment comprised of seven pearl millet genotypes, received from National Agricultural Research Centre, Islamabad was sown on 05-08-2016 at Millets Research Station, Rawalpindi, during Kharif 2016. Randomized Complete Block Design with three replications was used to lay out the experiment. Each plot consisted of four rows of 5 meter length spaced at 75 cm. Plant to plant distance was kept as 20 cm. Thinning/transplanting was done from 24-08-2016 to 31-08-2016 which produced good effect on overall plant growth. The experiment was harvested on 26-10-2016 and the data recorded on different plant parameters summarized in Table 82.

**Table 82: Results of Adaptability/National Uniform Millet Grain Yield Trial Kharif – 2016**

| R. No. | Varieties | Plants Harvested | Grain Yield (kg/ha) | Days to 50% Flowering | Plant Height (cm) |
|---|---|---|---|---|---|
| 1. | 6 | 87 | 3520a | 47 | 160 |
| 2. | 3 | 88 | 3381ab | 52 | 177 |
| 3. | 1 | 84 | 3254b | 47 | 168 |
| 4. | 7 | 86 | 2153c | 51 | 176 |
| 5. | 2 | 85 | 1780d | 50 | 177 |
| 6. | 4 | 86 | 1661d | 50 | 178 |
| 7. | 5 | 85 | 1152e | 46 | 184 |
| CV % | | 3.24 | 2.52 | 1.67 | 2.54 |
| LSD 1% | | 6.94 | 151.48 | 2.04 | 11.02 |

Analysis of variance showed highly significant differences among all the genotypes for grain yield, days to 50% flowering and plant height characters except plants harvested. The results presented in Table 82 revealed that entry No. 6 gave maximum grain yield of 3520 kg/ha with minimum plant height (160cm) followed by the entry No. 3 (3381Kg/ha) with maximum days to 50% flowering (52 days). Whereas, entry No. 5 produced minimum grain yield (1152 Kg/ha) and also took minimum number of days to 50% flowering (46 days) while took maximum plant height of 184 cm.

## 6. Pearl Millet on Farm Trials

**Table 83: Results of Pearl millet On Farm Trials Kharif -2016**

| Sr. No. | Location | Grain Yield (kg/ ha) | | |
|---|---|---|---|---|
| | | YBS-89 | YBS-95 | YBS-98 |
| 1. | Chakri, Rawalpindi | 1815 | 2250 | 2160 |
| 2 | Gujar Khan | 1925 | 2310 | 2200 |
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## MAIZE BREEDING SUB STATION, CHHARRAPANI (MURREE)

**Research Work Done:**

During the crop season 2016, Maize inbred line (F-271) was received from the office of Associate Maize Botanist, Maize Research Station, Faisalabad for seed multiplication. Sowing was done on April 19, 2016 in the research area of Maize Breeding Sub- Station, Chharrapani, Murree.

Sowing of maize inbred line 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. Flisto Gold (Pre emergence weedicide) was sprayed after sowing. Furadan granules @ 08 Kg / acre against stem borer and liquid insecticide (Confidor SL-200) @ 250 ml /acre against while fly was also applied.

During the cropping season proper rouging was done to maintain purity of the inbred line. A total number of 2478 cobs of the inbred line F-271 were harvested during the second week of August -2016 and shifted to the Associate Maize Botanist, Maize Research Station, Faisalabad for sowing in the kharif season. Total germplasm / grain weight (72 Kg) after drying, shelling and grading was entered in the store book for further use.

## SORGHUM RESEARCH SUB-STATION, DERA GHAZI KHAN

**SEASON AND ITS EFFECTS**

During the year 2016-17, 65.50 mm rainfall was received as compared to the year 2015-16, 194.50 mm rainfall was received. Non-availability of Irrigation water during month of July-2017, delayed sowing of trials till the last day of this month. A dry spell during September to December-16, helped in harvesting and threshing of 16 Kharif trials at this sub-station.

**Table 84: Metrological data of Sorghum Research Sub-Station, Dera Ghazi Khan**

| Sr. No. | Month | Average Temperature C* | | | | Rainfall (mm) | |
|---|---|---|---|---|---|---|---|
| | | Maximum | | Minimum | | | |
| | | 2015-16 | 2016-17 | 2015-16 | 2016-17 | 2015-16 | 2016-17 |
| 1 | July | 35.77 | 39.00 | 28.19 | 29.00 | 77.00 | 29.00 |
| 2 | August | 36.03 | 37.00 | 27.45 | 28.00 | 59.00 | --- |
| 3 | September | 36.20 | 38.00 | 25.63 | 27.00 | --- | --- |
| 4 | October | 34.16 | 37.80 | 21.55 | 26.33 | 03.00 | ---- |
| 5 | November | 27.33 | 28.50 | 14.16 | 13.90 | --- | --- |
| 6 | December | 22.74 | 25.43 | 08.29 | 10.73 | --- | --- |
| 7 | January | 20.00 | 19.29 | 07.61 | 07.96 | --- | 04.50 |
| 8 | February | 25.48 | 24.35 | 08.86 | 12.22 | --- | 02.00 |
| 9 | March | 28.25 | 29.00 | 16.55 | 15.93 | 33.00 | 04.00 |
| 10 | April | 34.30 | 37.56 | 21.33 | 22.06 | 15.00 | 05.00 |
| 11 | May | 41.87 | 42.06 | 27.61 | 28.23 | 05.50 | --- |
| 12 | June | 42.50 | 38.00 | 30.93 | 28.00 | 02.00 | 21.00 |
| Total rainfall | | | | | | 194.50 | 65.50 |
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**SORGHUM:**
**Sorghum Varietal Yield Trial**

Eight entries of sorghum were planted on 31.07.2016 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 3 m. 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 28.11.2016. The data recorded for different morphological traits are presented in Table 85.

**Table 85: Results of Sorghum Varietal Yield Trial at Dera Ghazi Khan During Kh-2016**

| S # | Entry Name | Crop Stand | Grain Yield (kg/ha) | Stalk Yield (kg/ha) | Plant Height (cm) | Days to 50% anthesis |
|---|---|---|---|---|---|---|
| 1 | YSS-10 | 59 | 3500 | 23445 | 157 | 76 |
| 2 | YS-16-(Check) | 58 | 3167 | 32167 | 251 | 82 |
| 3 | YSS-23 | 59 | 3000 | 26500 | 152 | 82 |
| 4 | YSS-18 | 58 | 2822 | 30889 | 163 | 74 |
| 5 | YSS-31 | 59 | 2500 | 15667 | 224 | 73 |
| 6 | YSS-98( Check) | 58 | 2355 | 21167 | 188 | 78 |
| 7 | YSS-25 | 58 | 2344 | 21333 | 137 | 76 |
| 8 | YSS-19 | 57 | 2200 | 20389 | 180 | 75 |
| | CV% | 1.46 | 4.75 | 1.08 | 1.78 | 0.95 |
| | LSD 5% | ---- | 227.58 | 452.53 | 5.66 | 1.27 |

The results reveal that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 3500 kg/ha was recorded for the entry YS-10 while minimum grain yield (2200 kg/ha) was recorded for entry YSS-19. Highest stalk yield was recorded for the check variety YS-16 (32167 kg/ha) while minimum stalk yield 15667 kg/ha was observed for YSS-31. Maximum plant height (251 cm) was also observed for check variety YS-16 while minimum plant height (137 cm) was observed for YSS-25. Entries YSS-23 and YS-16 took maximum 82 days to 50% anthesis while YSS-18 took minimum 74 days.

**Sorghum Hybrid Yield Trial**

Seven crosses and three check varieties of sorghum were planted on 31.07.2016 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 02.12.2016. The data recorded for different morphological traits are presented in Table 86.
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**Table 86: Results of Sorghum Hybrid Yield Trial at Dera Ghazi Khan During Kh-2016**

| S # | Entry Name | Crop Stand | Grain Yield (Kg/ha) | Stalk Yield (kg/ha) | Plant Height (cm) | Days to 50% anthesis |
|---|---|---|---|---|---|---|
| 1 | Lasani- Hybrid (check) | 39 | 4333 | 30000 | 185 | 77 |
| 2 | YSH-95 | 39 | 4089 | 37556 | 208 | 84 |
| 3 | YSH-122 | 38 | 3333 | 29444 | 168 | 74 |
| 4 | YS-16(Check) | 37 | 3289 | 33444 | 253 | 83 |
| 5 | YSH-61 | 38 | 3067 | 25444 | 190 | 78 |
| 6 | YSH-120 | 39 | 3067 | 26889 | 198 | 81 |
| 7 | YSS-75 | 38 | 2889 | 33667 | 207 | 78 |
| 8 | YSH-118 | 40 | 2822 | 24333 | 219 | 83 |
| 9 | YSH-121 | 39 | 2667 | 24333 | 188 | 83 |
| 10 | YSS-98 (Check) | 39 | 2467 | 21444 | 189 | 77 |
| | CV% | 3.27 | 7.43 | 1.64 | 1.43 | 0.99 |
| | LSD 5% | --- | 408.06 | 802.73 | 4.89 | 1.36 |

The above table reveals that differences of means due to genotypes were significant for all traits under study. The maximum grain yield of 4333 kg/ha was produced by check variety Lasani hybrid followed by YSH-95 with grain yield of 4089 kg/ha. Highest stalk yield was also recorded for the hybrid YSH-95 (37556 kg/ha) which is followed by the hybrid YSH-75(33667) kg/ha while minimum stalk yield was observed for check variety YSS-98 (21444 kg/ha). Maximum plant height was observed for check variety YS-16 (253 cm)) while minimum plant height of 168 cm was observed for the hybrid YSH-122. YSH-95 took maximum 84 days to 50% anthesis while YSH-122 took minimum 74 days also.

**Sorghum Genetic Studies Yield Trial**

Twenty lines/varieties of sorghum were planted on 31-07-2016 to evaluate the high yielding lines for utilizing in breeding program. The layout was done according to Randomized Complete Block Design with three replications in a plot size 5m x 3m. 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 03.12.2016. The data recorded for different morphological traits are presented in Table 87.

**Table 87: Results of Sorghum Genetic Studies Yield Trial at Dera Ghazi Khan during Kh-2016**

| S # | Entry Name | Crop Stand | Grain Yield (Kg/ha) | Stalk Yield (kg/ha) | Plant Height (cm) | Days to 50% anthesis |
|---|---|---|---|---|---|---|
| 1 | YSS-33 | | 3333 | 29777 | 202 | 75 |
| 2 | YSS-17 | | 3056 | 27389 | 155 | 75 |
| 3 | YSS-16 | | 3011 | 32722 | 250 | 83 |
| 4 | YSS-13 | | 2989 | 25500 | 183 | 77 |
| 5 | YSS-16 | | 2911 | 32167 | 249 | 81 |
| 6 | YSS-38 | 55 | 2889 | 19000 | 177 | 81 |
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| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | YSS-10 (Red) | 55 | 2811 | 18000 | 145 | 72 |
| 8 | YSS-16 (chalky- white) | 55 | 2778 | 25444 | 210 | 74 |
| 9 | YSS-16 (Red) | 55 | 2678 | 25500 | 196 | 73 |
| 10 | YSS-40 | 56 | 2545 | 18833 | 190 | 82 |
| 11 | YSS-25 | 56 | 2278 | 25500 | 136 | 74 |
| 12 | YSS-19 | 56 | 2211 | 20333 | 183 | 76 |
| 13 | YSS-39 | 55 | 2211 | 19055 | 175 | 76 |
| 14 | YSS-93 (creamy) | 56 | 2167 | 22000 | 169 | 81 |
| 15 | YSS-12 | 56 | 2078 | 17167 | 157 | 71 |
| 16 | YSS-41 | 56 | 1944 | 17555 | 187 | 81 |
| 17 | IC-1039 | 56 | 1933 | 18167 | 215 | 81 |
| 18 | YSS-37 | 56 | 1767 | 18389 | 248 | 72 |
| 19 | PAK-SS-II | 55 | 1556 | 11833 | 145 | 82 |
| 20 | PAK-SS-III | 55 | 1422 | 13167 | 182 | 81 |
| | CV% | 1.84 | 3.61 | 0.92 | 1.49 | 1.06 |
| | LSD 5% | --- | 144.67 | 332.64 | 4.63 | 1.35 |

The results reveal that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 3333 kg/ha was recorded for line/variety YSS-33 while minimum grain yield of 1422 kg/ha was recorded for PAK-SS-III. Highest stalk yield was recorded for check variety YS-16 i.e. 32722 kg/ha while minimum stalk yield was recorded also for entry PAK-SS-III (11833 kg/ha). Maximum plant height of 250 cm was also observed for YS-16 (check) while minimum plant height of 136 cm was observed for YSS-25. Check variety YS-16 took maximum 83 days to 50% anthesis while YSS-12 also took minimum 71 days.

**Sorghum Gene Pool**

Eighty one sorghum cultivars/lines comprising of local and exotic origin were sown on 31.07.2016 in strips having plot size 5m x 1.5m to maintain for breeding program. All entries were maintained by open pollination and guarded plants of each cultivar were harvested on 05. 12. 2016 and threshed carefully that will be sown for maintenance during KH-2016.

**PEARL MILLET**

**1- Pearl Millet Varietal Yield Trial**

Ten lines/varieties of pearl millet were planted on 31.07.2016 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 3m. Plant to plant and row to row distances were kept 20cm and 75cm respectively. Standard agronomic and plant protection measures were carried out in the experiment. The harvesting was done on 14. 11.20 16. The data recorded for different morphological traits are presented in Table 88.
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**Table 88: Results of Pearl Millet Varietal Yield Trial at Dera Ghazi Khan During Kh-2016**

| S # | Entry Name | Crop Stand | Grain Yield (kg/ha) | Stalk Yield (kg/ha) | Plant Height (cm) | Days to 50% anthesis |
|---|---|---|---|---|---|---|
| 1 | YBS-98 | 39 | 1156 | 8944 | 247 | 63 |
| 2 | YBS-94 | 39 | 1133 | 9168 | 259 | 64 |
| 3 | YBS-89 | 39 | 1000 | 9389 | 263 | 64 |
| 4 | YBS-95 | 39 | 911 | 10722 | 257 | 67 |
| 5 | YBS-83 | 40 | 867 | 10000 | 255 | 67 |
| 6 | YBS-93 | 40 | 822 | 9556 | 279 | 68 |
| 7 | YBS-70 | 40 | 756 | 9889 | 287 | 70 |
| 8 | YBS-92 | 40 | 689 | 7833 | 235 | 63 |
| 9 | 18-BY (C) | 39 | 633 | 12667 | 308 | 74 |
| 10 | YBR-5 | 38 | 607 | 7778 | 234 | 59 |
| | CV% | 1.85 | 6.89 | 1.39 | 1.04 | 1.49 |
| | LSD 5% | --- | 101.37 | 228.92 | 4.66 | 1.68 |

The results reveal that differences of means due to genotypes were significant for all traits under study. Maximum grain yield of 1156 kg/ha was recorded for check variety YBS-98 which is followed by the entry YBS-94 having grin yield value of 1133kg/ha while minimum grain yield of 607 kg/ha was recorded for YBR-5. Highest stalk yield of 12667 kg/ha was recorded for check variety 18-BY while minimum stalk yield of 8167kg/ha was recorded for YBR-5. Maximum plant height of 308 cm was observed also for standard variety 18-BY while minimum plant height of 234 cm was observed for YBR-5. YBR-5 took minimum 59 days to 50% anthesis as compared to standard variety 18-BY which took maximum 74 days.

**On-Farm Pearl Millet Yield Trial**

Two advance lines and a standard variety YBS-98 of pearl millet were tested at five 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. 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 89.

**Table 89: Results of On-Farm Pearl Millet Yield Trail at Dera Ghazi Khan During Kharif-2016**

| Sr. No. | Address of location | Grain yield (kg/ha) | | |
|---|---|---|---|---|
| | | YBS-89 | YBS-95 | YBS-98 |
| 1 | Muhammad Afzal S/O Muhammad Mirza R/O Mouza chak Buzdar, Chottizareen Distt. D. G. Khan | 1304 | 1205 | 1383 |
| 2 | Qazi Mustansarbillah Hashmi, Vehova, Tounsa Distt. D. G. Khan | 1245 | 1166 | 1344 |
| 3 | Atta ullah S/O Rasool Bukhsh Mouza Muhammad Hora, Jampur, Rajanpur. | 1186 | 1107 | 1125 |
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| | | | | |
|---|---|---|---|---|
| 4 | Ihsan Ahmad S/O Manzoor Ahmad Mouza Pukhaan Tounsa District D.G.Khan. | 988 | 949 | 1068 |
| 5 | Sajjad Ahmad S/O Ghulam Rasool Mangrotha Sharqi,Tounsa,D.G.Khan | 949 | 890 | 1008 |
| | | 1134 | 1063 | 1186 |

This table shows that the advance line YBS-98 gave maximum grain yield on an average i.e. 1186 kg/ha from five different locations in D.G.Khan Division as compared to the rest of entries of the trials.
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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
4	Associate Maize Botanist	01	-	01
5	Associate Millet Botanist	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
12	Assistant Agricultural. Chemist	-	01	01
13	Assistant Statistician	-	01	01
14	Assistant Research Officer	16	04	20
15	Superintendent	-	01	01
16	Field Assistant	17	10	27
17	Plant Observer	12	01	13
18	Ministerial Staff	14	01	15
19	Laboratory Assistant	02	01	03
20	Computer Operator	01	-	01
21	Stenographer	02	-	02
22	Foreman	01	-	01
23	Mechanic	01	-	01
24	Driver	05	-	05
25	Electrician	01	-	01
26	Naib Qasid	07	-	07
27	Tube well Operator	06	-	06
28	Beldar	40	06	46
29	Chowkidar	06	-	06
30	Mali	-	01	01
31	Sweeper	01	-	01
32	Cook	01	-	01
Total		**150**	**28**	**178**

LIST OF RESEARCH STAFF

Sr. No.	Name of Officer	Designation	Qualification
1	Dr. Muhammad Arshad	Maize Botanist	Ph.D.
2	Mr. Muhammad Rafique	Associate Maize Botanist	M. Sc. (Hons) Agri.
3	Dr. Irshad-ul-Haq	Associate Millets Botanist	Ph.D.
4	Mr. Dilbar Hussain	Sorghum Botanist	M. Sc. (Hons) Agri.
5	Malik Riaz Hussain	Assistant Botanist Maize	M. Sc. (Hons) Agri.
6	Mr. Muhammad Hussain Chaudhry	Assistant Botanist Maize	M. Sc. (Hons) Agri.
7	Mr. Muhammad Saeed	Assistant Botanist Maize	M. Sc. (Hons) Agri.
8	Rana Abdul Hamid Khan	Assistant Botanist Maize	M. Sc. (Hons) Agri.
9	Mr. Aamir Hussain	Assistant Botanist Maize	M. Sc. (Hons) Agri.
10	Mr. Ahsan Raza Mahli	Assistant Botanist Maize	M. Sc. (Hons) Agri.
11	Mr. Muhammad Siddique	Assistant Botanist Millets	M. Sc. (Hons) Agri.
12	Mr. Khadim Hussain	Assistant Botanist Maize	M. Sc. (Hons) Agri.
13	Mr. Ehsan-U-Allah	Assistant Botanist Sorghum	M. Sc. (Hons) Agri.
14	Mr. Javaid Iqbal	Assistant Agronomist	M. Sc. (Hons) Agri.
15	Mr. AsrarMehboob	Assistant Agronomist	M. Sc. (Hons) Agri.
16	Mr. Abdul Razaq	Assistant Research Officer	M. Sc. (Hons) Agri.
17	Mr. Tanweer Mukhtar	Assistant Research Officer	M. Sc. (Hons) Agri.
18	Mr. Shahid Hussain	Assistant Research Officer	M. Sc. (Hons) Agri.
19	Mr. Aamir Ghani	Assistant Research Officer	M. Sc. (Hons) Agri.
20	Mr. Muhammad Shakeel	Assistant Research Officer	M. Sc. (Hons) Agri.
21	Mr. Muhammad Altaf	Assistant Research Officer	M. Sc. (Hons) Agri.
22	Miss. SaeedaKhanum	Assistant Research Officer	M. Sc. (Hons) Agri.
23	Mrs. Zaib-un-Nisa	Assistant Research Officer	M. Sc. (Hons) Agri.
24	Mr. Barkat Ali	Assistant Research Officer	M. Sc. (Hons) Agri.
25	Mr. Naveed Kamal	Assistant Research Officer	M. Sc. (Hons)Agri.
26	Mr. Aamer Mumtaz	Assistant Research Officer	M. Sc. (Hons)Agri.
27	Mr. Waseem Akbar	Assistant Research Officer	M. Sc. (Hons)Agri.
28	Mr. Muhammad Irfan Yousaf	Assistant Research Officer	M. Sc. (Hons)Agri.
29	Mr. Hafiz MutahirJaved	Assistant Research Officer	M. Sc. (Hons)Agri.
30	Miss SairaSaleem	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, Iqbalnagar 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 Muree	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

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

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 crops.

ABRIDGED REPORT 2016-17

DR. Muhammad Arshad
Director

Off: +92-40-4301141
Fax: +92-40-4301028
directormmri@gmail.com

OVERVIEW

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° 41 N, longitude of 73° 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 kanals 6 marlas were occupied by the divisional authorities for establishment of modal bazaar during 2012. Now 2 kanals 8 marlas have been occupied by the divisional authorities for establishment of Forensic Science Agency at D.G.Khan recently. Presently 5 kanals 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 6132 kg/ha (2015-16) in Punjab due to adoption of hybrids. In maize 12 OPV's, 14 hybrids, four varieties of sorghum and two varieties of pearl millet have been released so far. Punjab Seed Council approved Maize hybrids; YH 1898, FH-949 & FH-1046 and Maize OPVs; Malka 2016, Sorghum OPV; YS-16 and Pearl Millet OPV; YBS-98 for general cultivation during the year 2015-16. Presently nine (9) maize hybrids, two maize OPVs and one elite sorghum hybrid are in progress and most of them are inn National Uniform Yield Trials and 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.

HYBRID MAIZE

Maintenance and Derivation of Yellow Maize Inbred Lines

At Maize & Millets Research Institute (MMRI), Yusafwala six hundred thirty four (634) inbred families and three hundred ninety nine (399) inbred lines were sown in ear to row fashion for maintenance during kharif 2016 and spring 2017, respectively. 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. Data regarding root anthocyanin, leaf sheath anthocyanin, margin serration, leaf margin waves, sheath hairs, leaf senescence, fertility of anthers, pollen shedding, anther color, pollen color, glumes color and silk color were also recorded for all lines separately. Whole inbred lines were harvested for next cycle of maintenance and purification.

Four hundred six (406) and four hundred sixty eight (468) derivative families were sown ear to row during kharif 2016 and spring 2017, respectively 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 and disease tolerance were self-pollinated in all the families.

At MRS, Faisalabad, 182 inbred lines & 208 derivatives were maintained in 2016-17. Twenty eight (28) new inbred lines were included in gene pool.

Maintenance and derivation of white maize inbred lines

Fifteen (15) and twenty three (23) inbred lines were maintained during kharif 2016 and spring 2017 respectively. One hundred and twenty five (125) and and one hundred forty three (143) derivative families of different generations were sown in ear to row fashion during kharif 2016 and spring 2017, respectively for derivation of inbred lines through hand pollination. At maturity, selfed plants were harvested in each family, separately, and seed was collected for further derivation and selection cycles.

Hybrid Constitution

Development of high yielding maize hybrids, tolerant to diseases, insects and high temperature, is a continuous project. At MMRI, Yusafwala, sixty seven (67) single crosses were constituted in Kharif 2016 with two males in two isolated blocks through detasseling of female lines while in spring 2017 thirty seven (37) single crosses were developed with two male in isolated block for evaluation in coming seasons. At MRS, Faisalabad, 75 new single cross hybrids were constituted during kharif-16

Hybrid Evaluation

Preliminary Yield Trials

Objective was to select high yielding newly constituted hybrids. At MMRI, Yusafwala sixty four (64) single crosses along with different commercial checks were evaluated in two preliminary yield trials during kharif 2016 and spring 2017. The trials were conducted under RCBD with two replications. The observation pertaining to germination %, days to 50% silking and tasseling, plant height, cob height and yield per plot were recorded and yield results of the promising hybrids among all entries were also recoded. Statistically significant differences were found among hybrids regarding grain yield kg/ha. YH-5482 gave maximum grain yield ie.9218 kg /ha while following entry was commercial hybrid i.e. NT-6621 and local hybrid YH-5514 giving 9215 and 8307 Kg/ha respectively during Kharif 2016. Similarly, during spring 2017, the yield results exhibited that there were significant differences among hybrids for grain yield Kg/ha. YH-5533 and YH-5535 gave maximum grain yield i.e.10250 and 10000 kg /ha, respectively against multinational checks.

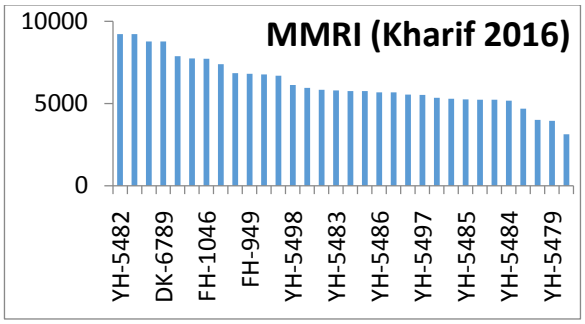

Fig. 1.Preliminary Hybrid Maize Yield Trial 1

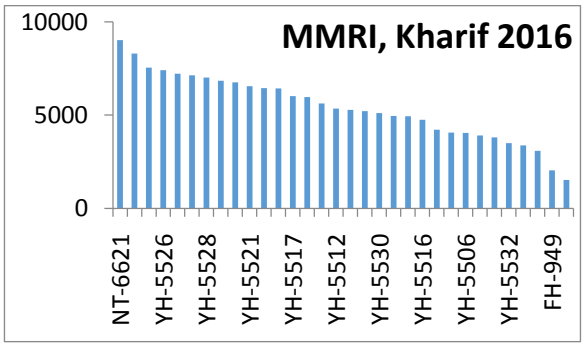

Fig. 2.Preliminary Hybrid Maize Yield Trial 2

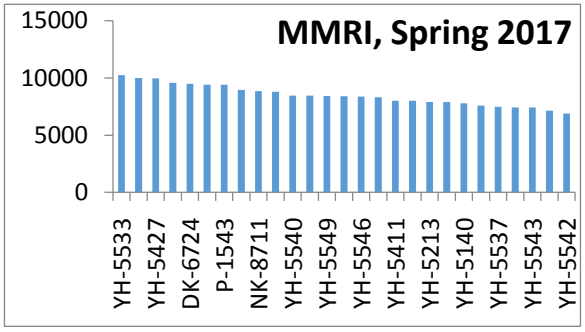

Fig. 3. Preliminary Hybrid Maize Yield Trial 1

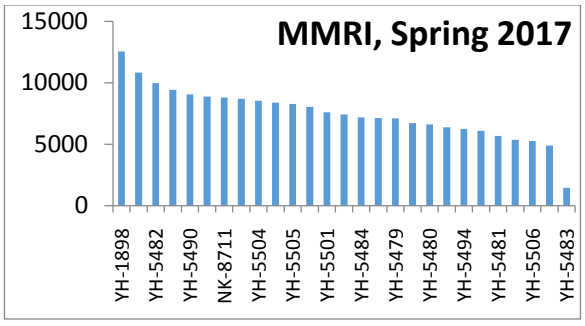

Fig. 4. Preliminary Hybrid Maize Yield Trial 2

Fig. 5. Promising maize hybrids of MMRI

At MRS, Faisalabad seventy eight (78) single cross hybrids were evaluated in three trials during Kharif 2016. Local hybrids FH-922, FH-1322-1, FH-1329, FH-1323 and FH-1350 with grain yield of 13747, 12514, 12038, 11955 and 11939 kg/ha respectively were higher yielder than commercial hybrids DK-6789 (10319 kg/ha) and NT-6621 (10640 kg/ha).

Fig. 6. Elite Maize hybrid FH-1275

In spring 2017, eighty one (81) single cross maize hybrids FH-1472 (10551 kg/ha), FH-1475 (10194 kg/ha), FH-1442 (10132 kg/ha) and FH-1454 (10064 kg/ha) were showing higher grain yield than commercial hybrids NK-8441 and DK-6724 with average grain yields 5809 and 4540 kg/ha respectively.

Fig. 7. Elite maize hybrid 5427

Micro Yield Trials

Two trials were conducted to select high yielding single crosses with desirable characteristics at MMRI, Yusafwala during spring 2017. 54 single crosses were sown in RCBD with 2 replications and two rows of 5m per plot in two trials. Statistically significant differences were observed among hybrids regarding grain yield Kg/ha. Local hybrids YH-5531 and YH-5532 with grain yield of 12684 & 12126 kg/ha, respectively were found higher yielders as compared with multinational checks NK-8711(11433 kg/ha) and YH-1898 (9717 kg/ha).

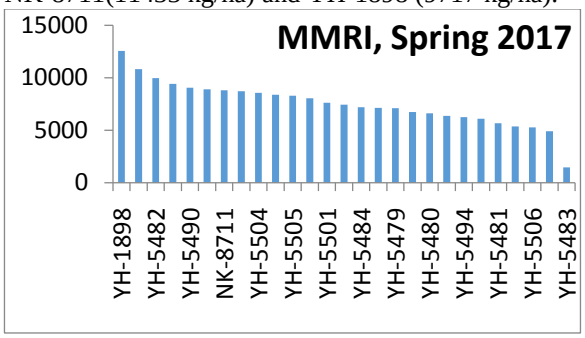

Fig. 8.Micro Hybrid Maize Yield Trial 1

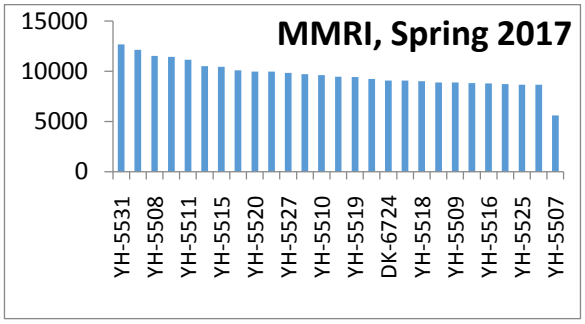

Fig. 9. Micro Hybrid Maize Yield Trial 2

In Kharif 2016 Local hybrid FH-1275, FH-1276, FH-1231, FH-1285 and FH-1289 with grain yields 11290, 10778, 10342, 10177 and 10053 kg/ha respectively were found higher yielder as compared to multinational checks DK-6789 (8874 kg/ha) and NT-6621 (8695 kg/ha). While in spring 2017 FH-1266, FH-1287, FH-1261 and FH-1365 with grain yields 9137, 9070, 9024 and 8996 kg/ha respectively were better yielder than the commercial checks NK-8441 (5615 kg/ha) and DK-6724 (5410 kg/ha).

Macro Yield Trials

In macro yield trial FH-1042 and FH-1219 with respective yield values 9361and 8325 kg/ha in Kharif 2016 were found better yielder than commercial checks DK-6789 (9056 kg/ha) and NT-6621 (7199 kg/ha) while in spring 2017 FH-929 and FH-1012 with grain yield 10963 and 10613 kg/ha respectively were found higher yielder as compared to local check FH-1046 (5379 kg/ha) and multinational hybrids NK-8441 (6270 kg/ha) and DK-6724 (4890 kg/ha) at MRS, Faisalabad.

Fig. 10. Elite Maize hybrid FH-1012

National Uniform Maize Hybrid Yield Trial

The objective was to check adaptability of different national and multinational maize hybrids in different agro-climatic zones across the country. A trial consisting of 42 hybrids in Kharif, 2016 received from the National Coordinator, PARC, Islamabadwas laid out in Alpha Lattice design with three replications. Plot size was kept 4m x 2.25m. The results revealed that entry 13 and entry 19 exhibited the highest grain yield of 12650 and 11170 kg/ha, respectively. During Spring-17, NUMYT (Yellow) Entry AC and AD yielded 7344 kg/ha and 7343 kg/ha respectively. In NUMYT (White) entries E (2672 kg/ha) and A (2253 kg/ha) were better yielder. While in Varietal trials OPV) entry M yielded 2482 kg/ha and sweet corn entry F yielded 1579 kg/ha. Five Promising hybrids FH-793, FH-922, FH-988, FH-1036 and FH-1292 were sent for evaluation during spring-2017.

Fig. 11. Maize Candidate hybrid FH-1036

Fig 12: Maize Candidate hybrid FH-988

Seed Production of Maize Parental Inbred Lines & Hybrids

Promising inbred line Y-9 was sown in isolated block of half kanal for seed increase. 41 Kg of seed was recovered at harvesting.

HTMA CIMMYT Trials

Twelve (12) CIMMYT HTMA trials comprised of 248 single cross hybrids of different origin were evaluated at Maize Research Station, Faisalabad for heat resilience in spring 2017. CIMMYT hybrids ZH1652, ZH1619, ZH61003, ZH1635, ZH16849 and ZH1775 with grain yield 4675, 4275, 3715, 3368, 2874 and 2776 kg/ha gave better grain yield than local check hybrids FH-94.

Fig 13: HTMA trial ZH1635 hybrid

On-going ADP Project

Two sets of sixty-four (64) local inbred lines of maize were sown under field condition & also in tunnel (controlled condition) for screening of heat resilient maize inbred lines at high temperature stress at flowering and grain filling stage (41.5^0c to 46.0^0c). Ten (10) lines were found heat stress tolerant. Fifty (54) new maize hybrids were tested for heat stress tolerance in replicated preliminary yield trial at MRS. Local hybrids FH-1371 & FH-1372 (10551 kg/ha), FH-1381 (12933 kg/ha), FH-1390 (11867 kg/ha) and FH-1382 (11467 kg/ha) performed better than the commercial checks NK-8441 (9365 kg/ha) and DK-6724 (7287 kg/ha).

On-Farm Yield trials

Local hybrids FH-1046, FH-949, FH-922 and FH-988 showed heat stress tolerance in on-farm trials conducted at five (5) locations.

MAIZE OPVs

Improvement of OPV YY-15 (OPVs)

Seed from spring 2016 was sown in an isolation of 1 kanal during Kharif 2016. Open pollination was allowed. Selection was made on the basis of plant height, stem girth, cob length and cob placement at 8^{th} node with medium tassel. Cobs were collected from the selected plants and seed was kept for next sowing season after table selection. Similar cycle was repeated for seed harvested from kharif 2016 in spring 2017.

Improvement and Maintenance of Yusafwala Pool-50

Seed received from spring 2016 was mixed and sown in isolation of 1 kanal during Kharif 2015. Open pollination was allowed and selection was made on the basis of plant height, stem girth, light tassel, cob length and lodging resistance. 200 cobs were selected. 100 cobs were kept for sowing in next season after table selection. Similar cycle was repeated for seed harvested from kharif 2016 in spring 2017.

National Uniform Maize Yield Trial (OPVs)

The trial comprising of 24 entries received from National Coordinator (Cereal System), Pakistan Agriculture Research Council in Kharif 2016 with the instructions and data sheet. Data regarding different traits were recorded at different growth stages / physiological and analyzed statistically. The results revealed that entry TP-1221 stood first and YW-786 was second by giving grain yield 9256 and 8960 kg / ha respectively followed by NP-9 which showed 8055 kg / ha yield. The trial comprising of 13 entries received from National Coordinator (Cereal System), Pakistan Agriculture Research Council in spring 2017 with the instructions and data sheet. Data regarding different traits were recorded at different growth stages / physiological and analyzed statistically. The results are awaited.

Micro Plot Maize Yield Trial (OPVs)

The trial comprising of nine maize OPVs was sown in RCB design with three replications during kharif 2016. Data of different traits were recorded at different growth stages / physiological maturity and analyzed statistically. The results revealed that promising line YY-15 stood 1st position by giving grain yield of 8393 kg/ha followed by YW-786 with grain yield of 7841 kg/ha while PAK-II gave the minimum grain yield of 3748 kg/ha.. During spring 2017, the trial comprising of eight maize OPVs was sown following triplicated RCB design. The results exhibited that promising line YY-15 ranked first with grain yield of 9953.7 kg/ha and PAK-I was at 2nd position (9578 kg/ha) whereas minimum grain yield (6077 kg/ha) was given by PAK-II.

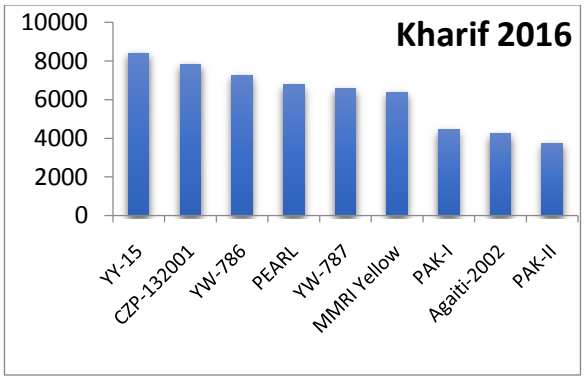

Fig 14: Micro Plot Maize Yield Trial (OPVs)

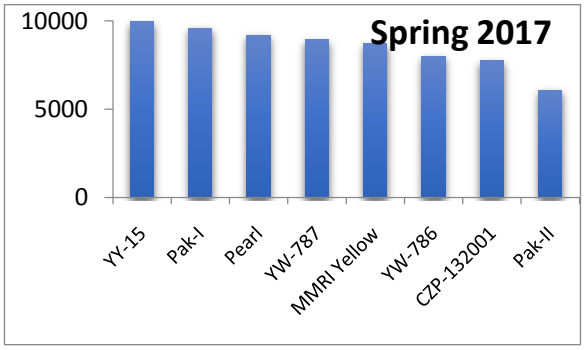

Fig 15: Micro Plot Maize Yield Trial (OPVs)

Micro Plot Maize Yield Trial (Pop & Sweet Corn)

Five maize entries were sown following triplicated RCB design during kharif 2016. The results showed that maximum grain yields (4664 kg/ha) was produced by promising line YPC-14 followed by YSC-15 with grain yield of 4603 Kg/ha while minimum grain yield of 3046 kg/ha was recorded for Pop Corn (Swat). **T**he trial comprising of five maize entries was laid out in RCB design with three replications during spring 2017. Data recorded for various traits at different growth stages / physiological maturity were analyzed statistically. The results revealed that that promising line Sweet Corn (Swat) was at top with grain yield of 5845 kg/ha followed by YPC-14 with grain yield of 5471 kg/ha while YSC-15 gave the minimum grain yield of 4910 kg/ha.

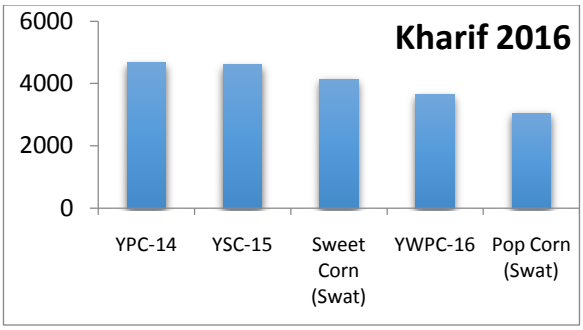

Fig 16: Micro Plot Maize Yield Trial (Pop & Sweet Corn)

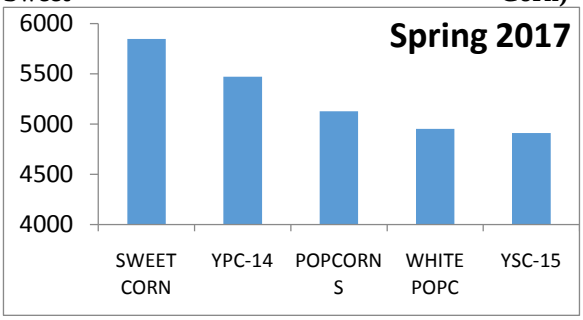

Fig 17: Micro Plot Maize Yield Trial (Pop & Sweet Corn)

Seed Production of Maize OPVs

During kharif 2015 & spring 2016, 2860 and 9976 kg seed of pearl was produced, respectively.

SORGHUM

Germplasm Maintenance and Hybrids Constitution

Eighty gene pool entries were planted at Yusafwala & D.G. Khan and 5 plants in each entry were maintained by covering the panicles. Ten sweet Sorghum lines were planted and maintained. Fourteen CMS (A) lines with their counterpart (B) lines and twenty six fertility restorer (R) lines were planted at Yusafwala for maintenance, and hybrid constitution. Twenty Eight (CMS x R) crosses were constituted (24 in isolation and 4 by hand). Eight F_2 families were planted in Kharif 2015 and 20 F_3 generations were harvested for next filial generation. Five F_4 families were planted and phenotypically superior plants from four families were selected and 7 F_5 generations were harvested for raising their next filial generation.

Evaluation of Hybrids and OPVs

Nine (CMS x R) hybrids and one check were tested in a hybrid yield trial at MMRI, Yusafwala and SRSS, D. G. Khan. The results revealed that YSH-95 and YSH--61 gave significantly higher yields (4278 and 3692 kg/ha) at MMRI, while at SRSS, D. G. khan, Lasani © and YSH-95 gave significant higher grain yields (4333 and 4089 kg/ha).

Eight entries were tested in a varietal yield trial at MMRI, Yusafwala and SRSS, D. G. Khan. The results revealed that YSS-10, YSS-98© and YSS-18 gave significantly higher yields (3767, 3620 and 3597 kg/ha) at MMRI, while at SRSS, D. G. khan, YSS-10 and YS-16 gave significant highest grain yields (3500 and 3167 kg/ha).

National Uniform Yield Trial

Eight entries were planted in trial at MMRI, Yusafwala. The results revealed that YSH-95 gave highest yield (2319 Kg/ha) followed by W-3535 (1813 Kg/ha) in comparison to Check YS-16 (1986 Kg/ha).

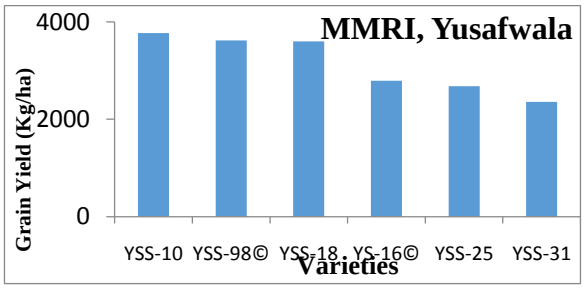

Fig 18: Sorghum Varietal Yield Trial

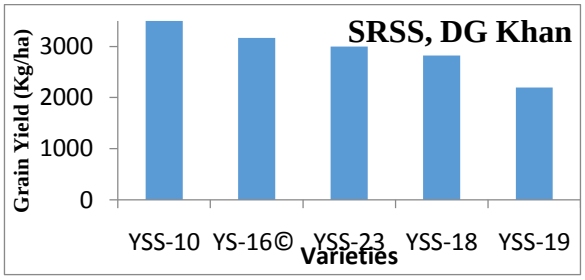

Fig 19: Sorghum Varietal Yield Trial

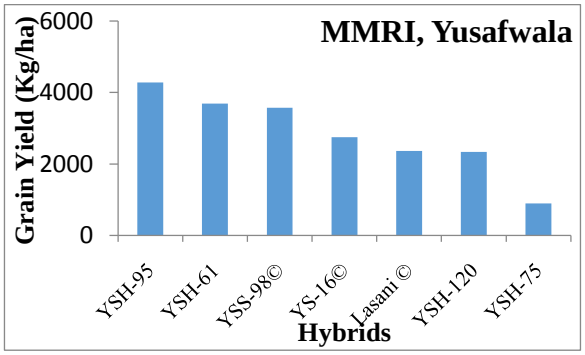

Fig 20: Sorghum Hybrid Yield Trial

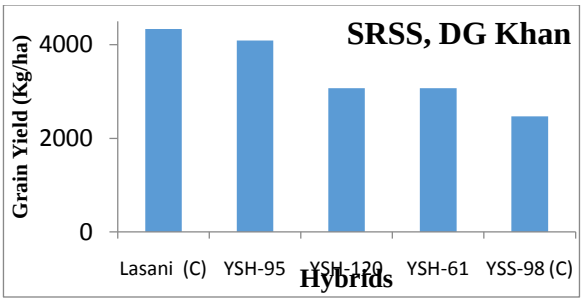

Fig 21: Sorghum Hybrid Yield Trial

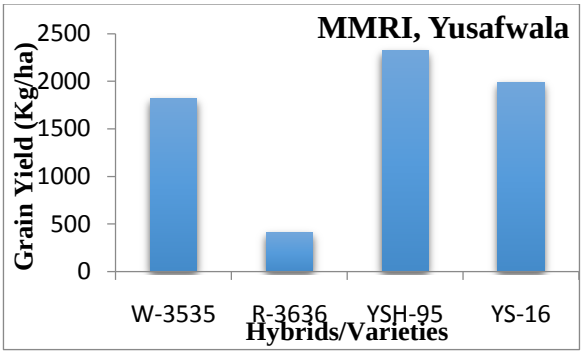

Fig 22: National Uniform Sorghum Yield Trial

Fig 23 .A high yielding sorghum variety YS-16

Pearl Millet

Maintenance of Germplasm / Derivations / Constitutions

Sixteen germplasm entries, 10 CMS (A) lines with respective counterpart (B) lines, 29 R-lines, were maintained by hand pollination. Derivation of Five S_{10} and 27 S_3 wasaccomplished.Fifteen (15) crosses were made by crossing CMS lines with R-Lines.

At Millets Research Station (MRS), Rawalpindi, 44 germplasm lines were maintained through hand pollination and 20 crosses were constituted for evolution. Ninety three single plants from F_2 populations, twenty nine from F_3 population and twenty from F_4 population respectively were selected for further evaluation, while eighteen superior phenotypically uniform lines were selected from F_3, F4and F_5 population for micro trial testing.

Fig 24. Maintenance of Pearl millet germplasm

Yield Evaluation

In pearl millet varietal yield trial, ten varieties were evaluated for yield at Yusafwala and D. G. Khan. The results showed that YBS-95 ranked first by producing grain yield of 2453 kg/ha at MMRI, Yusafwala and YBS-98 ranked first by producing 1156 Kg/ ha yield at SSR, D.G. Khan followed by YBS- 94 with yield of 1133 kg/ha.

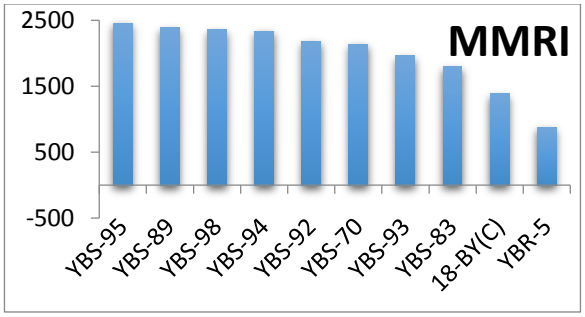

Fig 25: Pearl Millet Micro Yield Trial 1

National Uniform Pearl Millet Hybrid Yield Trial

A trial comprising of six entries, received from the National Coordinator (Cereal System), PARC, Islamabad, was conducted at MMRI as well as SRSS, D. G. Khan. The results revealed that entry 86M16 gave maximum grain yield of 4033 kg/ha followed by 86M84 (3783 kg/ha) while YBS-95 produced the lowest grain yield of 2217 kg/ha.

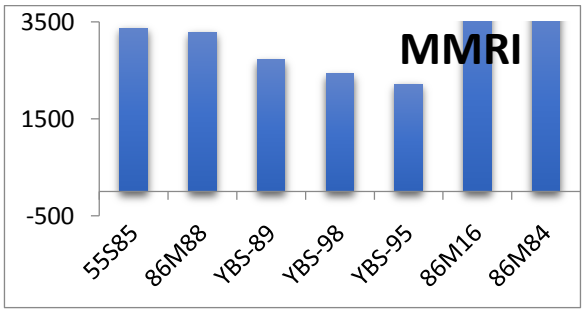

Fig 26: Pearl Millet National Uniform Yield Trial

Pearl Millet Micro Yield Trial

Two trials comprising of eight pearl millet entries each was laid out following RCB design with three replications at Millet Research Station Rawalpindi. Data of different traits were recorded at different growth stages/ physiological maturity and analyzed statistically. The results showed that Genotype 15RBS-07 gave maximum yield (2882kg/ha) followed by 15RBS-03 (2164kg/ha) while check variety YBS-98 gave 1102kg/ha yield in first trial and genotype 14RBS-05 gave maximum yield (2326kg/ha) followed by 14RBS-01 (2189kg/ha). While the yield recorded for check variety YBS-98 was 1575kg/ha in trial 2. Ten lines/varieties were planted to evaluate the promising lines for grain yield at SRSS, DG Khan. Results revealed that YBS-98 gave significantly the highest grain yield of 1156 kg/ha followed by YBS-94 with grain yield of 1133 kg/ha but remained statistically at par.

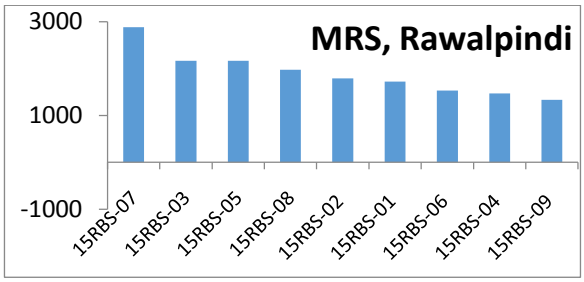

Fig 27: Pearl Millet Micro Yield Trial 1

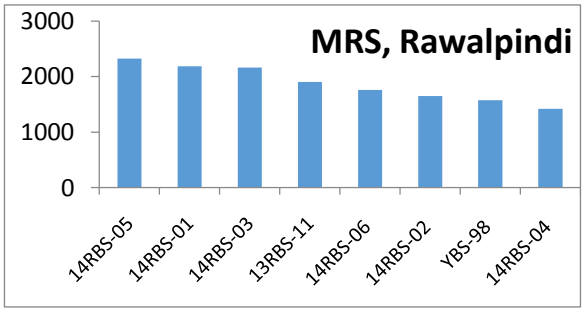

Fig 28: Pearl Millet Micro Yield Trial 1

Seed Production of Pearl Millet Varieties

During kharif 2016, 18 BY, YBS-98, YBS-95, YBS-93, YBS-70 and YBR-5 were sown. They produced 208, 535, 170, 131, 71 and 22 Kg seed respectively.

AGRONOMIC STUDIES

Determination of Optimum Plant Population for Maize OPV (YY-15)

Trials were conducted during kharif 2016 and spring 2017 following RCB design with four replications to determine effect of plant spacing on grain yield of maize OPV (YY-15). Data concerning crop stand, days to 50% silking, plant height, cob height and grain yield were recorded, compiled and statistically analyzed**.** The data showed that different plant population levels significantly affected the grain yield & cob height of maize OPV YY-15. Days to 50 % silking & plant height remained non-significant in both season. In Kharif 2016, maximum grain yield of 7783 kg/ha was obtained with T_2 (88888 plants/ha) however it was statistically at par with T_1 (106666 plants/ha) which yielded 7293 kg/ha. While in spring 2017 maximum grain yield of 7783 kg/ha was obtained with T_2 (88888 plants/ha) however it was statistically at par with T_1 (106666 plants/ha) which yielded 7293 kg/ha.

Effect of Different Planting Methods on Grain Yield of Maize OPV YW-786

During kharif 2016 and spring 2017, trials were conducted following RCB design with four replications keeping plot size 5 × 5.25m. Data regarding the plant stand, days to 50% silking, plant height, cob height and grain yield were recorded and analyzed statistically. T_1 {Ridge Sowing R-R (30″) sowing on one side} produced significantly highest grain yield (6364 and 8613 kg/ha) of maize OPV YW-786, which is statistically at par with T_3 {Bed Sowing B-B (42″) both side} by producing 5781 and 8613 kg/ha. Whereas T_4 {Bed Sowing B-B (48″) both side produced minimum yield of 4913 and 7093 kg/ha. Planting methods also effected days to 50 % silking, plant height and cob height significantly.

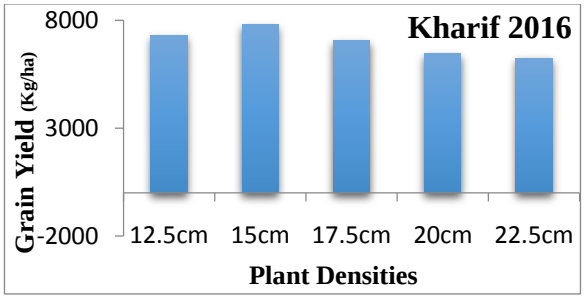

Fig 29.Determination of Optimum Plant Population for Maize OPV (YY-15)

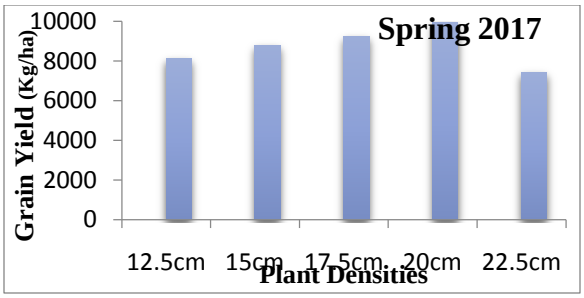

Fig 30.Determination of Optimum Plant Population for Maize OPV (YY-15)

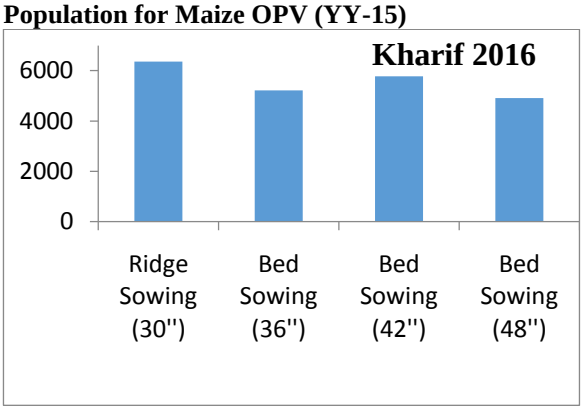

Fig 31.Effect of Different Planting Methods on Grain Yield of Maize OPV YW-786

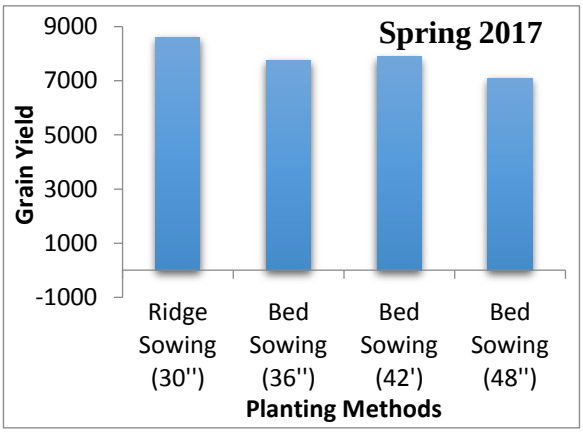

Fig. 32.Effect of Different Planting Methods on Grain Yield of Maize OPV YW-786

Determination of Optimum Plant Population for Maize (Pop & Sweet Corn)

During kharif 2016 and spring 2017, trials were conducted following split Plot Design with three replications keeping plot size 5 × 5.25m to determine grain yield of OPV's of Popcorn (YPC-14) and Sweet corn (YSC-15) as affected by different plant populations. Data concerning crop stand, days to 50% silking, plant height, cob height and grain yield were recorded and statistically analyzed. The data showed that different plant population levels significantly affected the grain yield maize OPV's YPC-14 & YSC-15. Varieties remained non-significant. The interaction (Varieties x population levels) was also significant in both seasons. In Kharif 2016, maximum grain yield of 6343.2 kg/ha was obtained with T_1 (106666 plants/ha, 12.5 cm) however it was statistically at par with T_2 (88888 plants/ha, 15 cm) which yielded 5558.8 kg/ha. While maximum grain yield of 5891 kg/ha was obtained with T_3 (76190 plants/ha, 17.5 cm) however it was statistically at par with T_4 (66666 plants/ha, 20 cm) which yielded 5846 kg/ha.

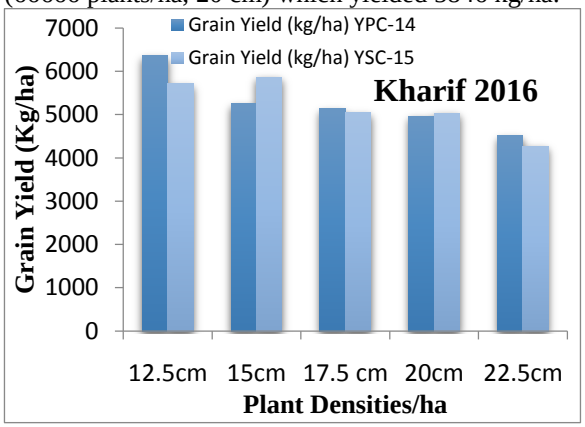

Fig. 33.Determination of Optimum Plant Population for Maize (Pop & Sweet Corn)

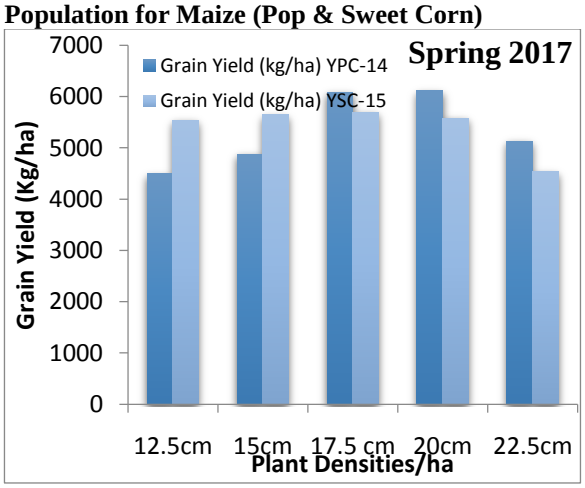

Fig. 34.Determination of Optimum Plant Population for Maize (Pop & Sweet Corn)

Determination of Plant Population Levels for Grain Yield of New Pearl Millet Variety

In kharif 2016, trial was laid out in RCB design with four replications keeping plot size 5 × 3m to determine grain yield of YBS-95 as affected by different plant papulations. Data regarding crop stand, days to 50% anthesis, plant height, number of tillers per plant, and grain yield were recorded and analyzed. The results revealed that different plant densities under study significantly affected days to 50% anthesis and plant height, while number of

tillers per plant and grain yield remained non-significant of pearl millet variety YBS-95.

Determination of Optimum Plant Population Levels for Sorghum Hybrid

During kharif 2016 experiment was laid out under RCBD with four replications keeping plot size 5 × 3m to determine gain yield of sorghum hybrid YSH-95 as affected by different plant population levels. The results indicated that plant population levels significantly affected the grain yield, days to 50 % anthesis and plant height of sorghum hybrid YSH-95.

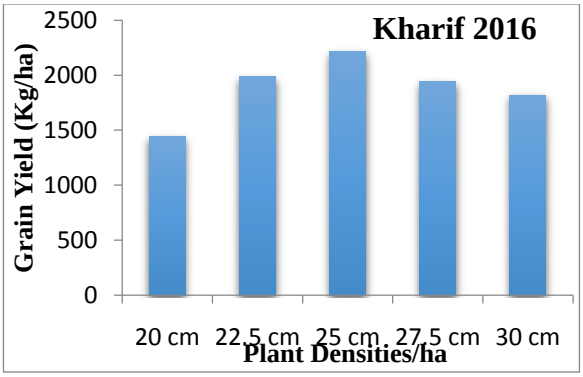

Fig. 35. Determination of Plant Population Levels for Grain Yield of New Pearl Millet Variety

Maximum grain yield of 2467 kg/ha was obtained with T_2 88888plants/ha, in contrary T_1 (76190) yielded minimum (1937 kg/ha).

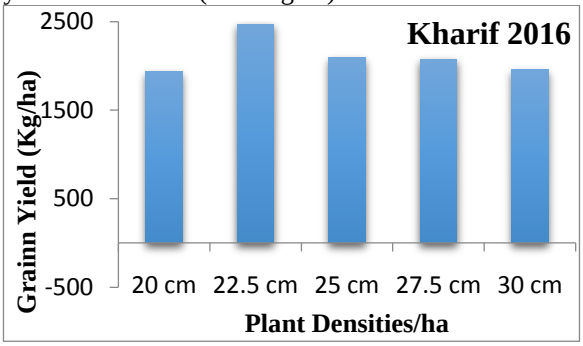

Fig. 36 Determination of Optimum Plant Population Levels for Sorghum Hybrid

SOIL CHEMISTRY STUDIES

Impact of Fertilizer Level on Grain Yield of Maize Hybrid Seed production (YH-1898)

The experiment was performed following triplicated RCB design during spring 2017 to probe out the impact of fertilizer levels on maize hybrid seed production (YH-1898). It was revealed that maximum seed yield (2325 kg/ha) was obtained at fertilizer dose of 300-150-100 (NPK) whereas minimum seed yield of 1210 kg/ha was recorded where no fertilizer was applied.

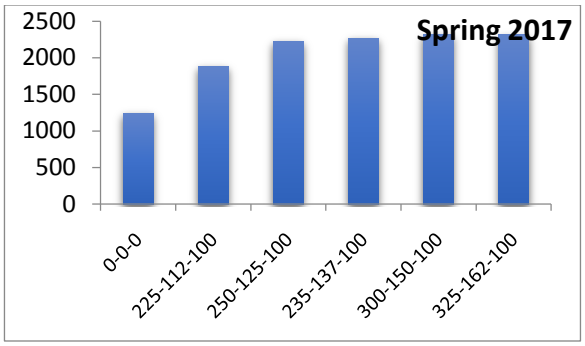

Fig 37: Impact of Fertilizer Level on Grain Yield of New Maize Hybrid Seed production (YH-1898

ENTOMOLOGY

Testing of Seed Dressing Insecticides against Shoot Fly and Maize Borer

Four insecticides namely Poncho Plus 600 FS, Confidor 70 WS, Actara 70 WS and Furadan 3G were tested against shootfly and maize borer at recommended doses. The experiment was laid out according to RCBD in four replications. Data regarding shootfly infestation %age, maize borer infestation %age and grain yield were recorded. The results showed that Confidor 70 WS gave the best control against shootfly showing minimum shootfly infestation %age (1.61) followed by Poncho Plus 600 FS showing shootfly infestation %age (1.69) whereas Poncho Plus 600 FS gave the best control against maize borer showing maize borer infestation %age (2.21) followed by Furadan 3G showing maize borer infestation %age (2.34). As far as the yield is concerned, Poncho Plus 600 FS produced maximum yield (6061 Kg/ha) followed by Furadan 3G which produced the yield (5614 Kg/ha) in Kharif 2016 while in spring 2017 Actara 70 WS gave the best control against shootfly showing minimum shootfly infestation %age (0) followed by Poncho Plus 600 FS showing shootfly infestation %age (0.88) where as Poncho Plus 600 FS gave the best control against maize borer showing minimum maize borer infestation %age (0.88) followed by Furadan 3G showing maize borer infestation %age (1.32). As far as the yield is concerned, Poncho Plus 600 FS produced maximum yield (12375 Kg/ha) followed by Confidor 70 WS which produced the yield (11681 Kg/ha).

Testing of sprayable insecticides against shootfly and maize borer

Four insecticides namely Tri Super 40 EC, Trizone 40 EC, Lamcin 2.5 EC and Jatara 10 EC were tested against shootfly and maize borer at recommended doses. The experiment was laid out according to RCBD in four replications. Data regarding shootfly infestation %age, maize borer infestation %age and grain yield were recorded. The results showed that

trizone 40 EC gave the best control against shootfly showing minimum shootfly infestation %age (4.24) followed by Tri Super 40 EC showing shootfly infestation %age (4.29) whereas Trizone 40 EC gave the best control against maize borer showing minimum maize borer infestation %age (1.40) followed by Trisuper showing maize borer infestation %age (1.42). As far as the yield is concerned, Trizone 40 EC produced maximum yield (11845Kg/ha) followed by Trisuper 40 EC which produced the yield (11642 Kg/ha).

Testing of seed dressing insecticides against shootfly

Four insecticides namely Trunk 20 SC, Parlor 20 SC, Marine 20 SC and Confidor 70 WS were tested against shootfly at recommended doses. The experiment was laid out according to RCBD in four replications. Data regarding shootfly infestation %age and grain yield were recorded. The results showed that Trunk 20 SC & Parlor 20 SC gave the best control against shootfly showing minimum shootfly infestation %age (0, 0) with grain yield 12161 Kg/ha and 11881 Kg/ha respectively followed by Marine 20 SC showing shootfly infestation %age (1.35) with grain yield 11367 Kg/ha.

PLANT PATHOLOGY

Testing of Stalk Rot Intensity in Maize Varieties by Artificial Inoculation

The experiment comprising of five maize varieties was laid out according to RCBD with four replications during kharif 2016 and spring 2017. At silking stage, 5plants/plot were inoculated with infected tooth picks. After one month of inoculation, each inoculated plant was torn apart by a scalpel and the disease reaction was recorded with the help of Hooker's disease rating scaleThe results showed that all studied maize varieties YY-15, YW-786, YPC-14, YSC-15 and CZP-132001 are moderately resistant against stalk rot.

Testing of seed dressing fungicides against seedling blight in maize

Four fungicides namely Topsin-M 70 WP, Protocol 50 WP, Nanok 25 SC and Polyram DF70 were tested against seedling blight at recommended doses. The experiment was laid out according to RCBD in four replications. Data regarding seedling blight attack %age and grain yield were recorded. The results showed that Topsin-M 70 WP gave the best control showing minimum seedling blight attack %age (1.34) with grain yield 12172 Kg/ha followed by Nanok 25 SC showing seedling blight attack %age (1.75) with grain yield 11709 Kg/ha.

Farmer Advisory Services:

Seven (7) TV talks, Thirty Eight (38) radio talks were delivered to farmers about the maize, sorghum and pearl millet.

Foreign Collaborations: Two projects of maize (Agriculture Innovation Program, AIP and Heat Tolerant Maize for South Asia, HTMA) are successfully going on. A scientist successfully completed two weeks training at regional office of CIMMYT, Nairobi, Kenya regarding doubled haploid technology of maize.

PUBLICATIONS

1. Mumtaz, A., D. Hussain, M. Saeed, M. Arshad, M. I. Yousaf and W. Akbar. 2017. Association Studies of Morphological Traits in Grain Sorghum (*Sorghum bicolor L.)* Journal of Agriculture and Basic Sciences. 2(1): 37-43.
2. Yousaf, M. I., K. Hussain, S. Hussain, A. Ghani, R. Shahzad, A. Mumtaz, T. Mukhtar, M. Arshad. 2017. Morphometric and Phenological Characterization of Maize (Zea mays L.) Germplasm under heat stress. Int. J. Biol. Biotech. 14 (2): 271-278
3. IrshadulHaq, M., M.H. Choudhry and M. Arshad. 2017. Evaluation of promising lines of pearl millets in two seasons. Int. J. Biol. Biotech. 14 (1): 129-133.

SENIOR SCIENTISTS

Dr. Muhammad Arshad
Maize Botanist
0333-6568996
drarshad_261@yahoo.com

Mr. Muhammad Rafique
Associate Maize Botanist
0300-7692769
maizfsd@yahoo.com

Dr. Muhammad Irshad-Ul-Haq
Associate Millet Botanist
0321-5054460
rwp@yahoo.com

Mr. Dilbar Hussain
Sorghum Botanist
0345-7439233
dilbarhussainmmri@gmail.com

Malik Riaz Hussain
Assistant Botanist Maize
0346-7469654
riazhussainabm@gmail.com

Mr. Muhammad Hussain Chaudhry
Assistant Botanist Maize
0301-7896461
hussain_chaudhry2002@yahoo.com
Hussain.jaja@gmail.com

Mr. Ahsan Raza Malhi
Assistant Botanist Maize
0333-6522066
malhi_ar@yahoo.com

Mr. AsrarMehboob
Assistant Agronomist
03007576502
asrarmmri@gmail.com

Metrological Data Recording at Maize & Millets Research Institute, Yusafwala during 2016-17

Month/Year	Avg. Maximum Temperature (C°)	Avg. Minimum Temperature (C°)	Humidity %		Rainfall (mm)
			08:00 AM	05:00 PM	
Jul-16	39.2	28.58	69.04	72.22	92.30
Aug-16	39.09	27.09	72.16	52.22	75.00
Sep-16	37.25	23.90	67.94	40.11	1.00
Oct-16	34.71	18.55	75.16	46.71	-
Nov-16	27.10	12.40	83.75	69.26	-
Dec-16	26.39	9.00	88.97	75.42	-
Jan-17	20.19	6.51	84.19	61.00	8.00
Feb-17	26.89	9.50	71.03	35.78	4.00
Mar-17	32.29	14.12	66.22	35.87	1.00
Apr-17	40.33	21.53	46.60	31.07	8.5
May-17	41.90	25.81	49.93	30.71	16.60
Jun-17	40.13	26.50	58.50	41.80	-

(Dr. Muhammad Arshad)
Director
Maize & Millets Research Institute,
Yusafwala, Sahiwal