ANNUAL PROGRAMME OF RESEARCH WORK OF SUGARCANE FOR THE YEAR 2014-2015.

BRIEF NOTE

Sugarcane is grown on 757 thousand hectares in Punjab with production of 4370 million tones and average cane yield of 62.60 t ha^{-1} for the year 2013-14. Low yield is a challenge and demands special emphasis on research and production technology efforts. The Annual Research Programme is prepared to develop the research strategy for the coming crop year.

The Research Programme includes 64 experiments on various disciplines including Sugarcane Breeding (17), Agronomy (10), Technology (5), Pathology (11) and Entomology (11) on going trials and new trials. The Sugarcane Breeding component includes collection of fuzz and cultivars, raising of seedlings, selection of seedlings, screening and selection of varieties at various selection stages and varietal adaptability under different soil and climatic conditions. The research programme work also includes cane flowering at Research Sub Station, Tret, Murree. The Annual Programme of Research Work for 2014-15 at Khanpur / Bahawalpur Sub-Stations includes 10 experiments.

Sugarcane Agronomy comprises of experiments on fertilizer and water use efficiency under different regimes, seed rates, spacings, ratooning and different cultural operations. Development of production technology is another important aspect of this discipline.

Study on cane juice analysis of different varieties is a permanent feature of sugarcane research for determining sugar yield. Besides these studies, gur quality of different varieties will be done.

Study on disease resistance/tolerance in different varieties starting from Nursery to final varietal trials is a permanent feature of this Institute. Information is obtained on red rot, smut, pokkah boeng, red stripe, rust and mosaic virus. Varieties are screened against diseases under natural/artificial inoculation conditions.

Screening of varieties against insect pests is another important component of research programme i.e. development of IPM strategy for efficient control measures.

Zonal testing of cane varieties under the umbrella of PARB project is an important component of Sugarcane Research Programme. It gives information on adaptability of cane varieties in different ecological zones. It provides feed-back from the growers towards varietal behaviour in various soil and climatic conditions.

The Annual Programme of Research Work also includes varietal & agronomic experiments planted at Sugarcane Research Stations, Khanpur/Bahawalpur.

Testing of varieties from different Institutes in National Uniform Varietal Yield Trial (NUVYT) is also a regular feature of this Institute.

A. SUGARCANE BREEDING & VARIETY DEVELOPMENT

1. TITLE **DESCRIPTION AND EVALUATION OF VARIOUS SUGARCANE BREEDING MATERIAL ON THE BASIS OF SYNCHRONIZATION BEHAVIOUR**

OBJECTIVES	To carry out hybridization of desired genotypes with active economical traits after examining their synchronization.
RESEARCHERS:	Muhammad Farooq Ahmed, Dr. Muhammad Ijaz Tabassum, Abdul Sattar, Dr. Muhammad Afzal and Zulfiqar Ali
PROJECT DURATION	Continuous nature
LOCATION	Sugarcane Breeding Sub-Station (SBSS), Murree
TREATMENTS	Synchronization of 145 different varieties/ breeding lines from different national and international sources
METHODLOGY	Breeding lines will be sown at two experimental sites Pail and Charrapani under natural environmental conditions. Each entry will be planted in a single row of 5.5 meters by maintaining a row to row distance of 1 meter followed by normal agronomic practices. Synchronization will be recorded regarding flowering parameters among all the varieties/breeding lines under natural environmental conditions.
PREVIOUS YEAR'S RESULTS	Few breeding lines, showing synchronization as earlier under natural environmental conditions, have been found. These are Co-602, S-95, NS-20, NS-6, NSG-45, S-94, FSH-229 and CPF-198.

2. TITLE **HYBRIDIZATION AMONG VARIOUS SUGARCANE VARIETIES/BREEDING LINES AND PRODUCTION OF FUZZ IN OPEN POLLINATION**

OBJECTIVES	To bring anticipated economical traits combined in one genotype/ variety.
RESEARCHERS:	Muhammad Farooq Ahmed, Dr. Muhammad Ijaz Tabassum, Dr. Muhammad Afzal, Abdul Sattar and Zulfiqar Ali
PROJECT DURATION	Continuous nature
LOCATION	Sugarcane Breeding Sub-Station (SBSS), Murree

TREATMENTS

All the varieties/breeding lines showing flowering synchronization will be involved in hybridization process. Hybridization will be practiced among 30 breeding lines/varieties in following cross combinations.

Sr#	Crosses			Sr#	Crosses		
1	HSF-240	x	S-03-US-312	13	S-06-US-904	x	CoL-50
2	Co-548	x	S-06-US-904	14	S-05-FD-307	x	Co-1148
3	S-84-US-1543	x	CPF-247	15	BL-3	x	S-96-SP-680
4	CPF-247	x	S-95-NSG-6	16	S-84-US-1543	x	SPF-241
5	CPF-198	x	S-05-FD-317	17	CPF-246	x	Co-1148
6	S-04-FD-298	x	S-94-HS-229	18	S-04-FD-298	x	Co-548
7	HSF-240	x	S-95-NSG-60	19	S-06-SP-18	x	CoL-69
8	S-03-US-127	x	Co-285	20	S-03-US-127	x	Co-1148
9	SPF-232	x	LHo-83-153	21	S-06-US-904	x	CoL-69
10	Co-312	x	S-03-US-127	22	S-03-US-127	x	Co-602
11	HSF-242	x	Co-1148	23	CPF-246	x	BL-3
12	S-06-US-904	x	CP-85-1491	24	HF-160	x	S-06-US-904

METHODLOGY

Selected plants will be planted close to each other and their arrows will be bagged together using muslin cloth soon after their emergence. Hybridization will be carried out among lines producing efficient flowering in March-May, 2016.

PREVIOUS YEAR'S RESULTS

Fuzz produced from varieties/breeding lines at SBSS during 2014.

Collected from	Numbers	Total Arrows
Varieties/breeding lines (both at Pail and Charrapani)	49	959
Crosses	11	70
Total	**60**	**1029**

3. TITLE: RAISING OF NURSERY FROM FUZZ

OBJECTIVES: To raise sugarcane seedlings from fuzz produced in open pollination and biparental crosses for selection of genotypes having desired traits

RESEARCHERS: Muhammad Farooq Ahmed, Dr. Muhammad Ijaz Tabassum, Abdul Sattar, Dr. Muhammad Afzal & Zulfiqar Ali

PROJECT DURATION: Continuous nature (2014-15)

LOCATION: Sugarcane Breeding Sub-Station (SBSS), Murree

TREATMENTS: Fuzz produced at local from different breeding lines/varieties in biparental crosses and open pollination

METHODOLOGY: Fuzz will be collected from arrows and will be sown during the month of June-2015. Temperature will be maintained at between 30-35^{o}C and other plant protection measures will be followed. After about 40 days of fuzz sowing, seedlings thus produced will be singled and shifted to plastic bags of size 4" x 6". Subsequent shifting to SRI, Faisalabad.

PREVIOUS YEAR'S RESULTS Seedlings raised / shifted the field during 2013.

Sr. No.	Source of fuzz	Total produced seedlings
1.	Open pollination	219
2.	Crosses	15
	Total:	**234**

4. TITLE: GROWING OF SUGARCANE FUZZ AND TRANSPLANTATION OF SEEDLINGS IN THE EARTHEN POTS.

OBJECTIVES: To raise sugarcane seedlings from fuzz having different genetic constitution for the selection of superior phenotypes.

RESEARCHERS: Dr. Muhammad Ijaz Tabassum, Abdul Sattar, Dr. Muhammad Afzal & Zulfiqar Ali

PROJECT DURATION: Continuous nature (2015)

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS: Sugarcane fuzz received from local and exotic resources.

METHODOLOGY: Germination test of fuzz will be done under ambient conditions to check its viability prior to its sowing. Raised beds will be prepared under shade. During the months of June- July 2015, cane fuzz will be spread evenly over the surface of seed beds and lightly covered with fine silt. Seed beds will be watered thoroughly with hand sprinkler. Germination will be

observed after three days. Loss of seedlings from pythium root rot or other soil born diseases will be reduced by sterilization of media of seed beds and by drenching beds regularly with a suitable fungicide.

A mixture of liquid nutrients containing essential macro and micro elements @ 10 ml and liquid fertilizer containing Nitrogen, Phosphate, potassium, sulphur @ 10 ml) dissolved in water (10 l) will be used to fertigate and nourish the seedlings once a week from one week after sowing of fuzz. The number of germinated seedling will be counted. Seedlings aged 45-60 days will be shifted in the earthen pots. Successful earthen potted seedlings at the age of 4-5 month will be transplanted in field for further evaluation.

PREVIOUS YEAR'S RESULTS

Seedlings raised from fuzz and shifted in earthen pots, 2014.

Sr. No.	Source of fuzz	Seedling on seed beds	Total seedlings shifted in earthen pots.	Total seedlings raised from fuzz
1.	Sri Lanka	25,466	24,534	50,000
2.	SBSS, Tret (Murree) - Seedlings were raised at Murree	-	218	218
	Total:	25,466	24,752	50,218

5. TITLE: **STUDY OF SUGARCANE SEEDLINGS IN FIELD AND SELECTION OF DESIRABLE PHENOTYPES.**

OBJECTIVES: To select desirable phenotypes from the progeny of each cross having different genetic make-up for further evaluation.

RESEARCH WORKER(S): Abdul Sattar, Dr. Muhammad Ijaz Tabassum, Dr. Muhammad Afzal & Zulfiqar Ali

PROJECT DURATION: Continuous nature (2015)

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS: Successful earthen potted seedlings raised from fuzz.

Std. commercial Check = CPF-247
Irrigation / Fertilizer = Normal.
Sowing geometry P × P = 75 cm
R × R = 120 cm

METHODOLOGY: Successful potted seedlings, raised from fuzz (during 2014), will be transplanted in field in accordance with the sowing geometry during February-2015. A single row of check will be sown in the centre of each plot. Standardized agronomic / cultural practices will be carried out. Observations will be recorded for cane growth, cane stand, lodging, pith, diseases and insect pest's infestation. At maturity of the crop (Sep – Oct, 2015), brix will be recorded with hand refracto-meter and superior phenotypes will be selected. The selected single plants will be promoted to Nursery-I for further evaluation.

PREVIOUS YEAR'S RESULTS 2574 superior plants were selected and promoted to Clonal Nursery-I during the year, 2014. The detail is tabulated below:

Sr. No.	Source of fuzz	Seedlings transplanted in field	Seedlings Selected
1.	Sri-Lanka	58270	2332
2.	South Africa	5439	199
3.	NSCRI, Makli, Thattha, Sindh	585	43
4.	SBSS, Trett, Murree	46	-
	Total:	**64340**	**2574**

6. TITLE: INTRODUCTION AND MAINTENANCE OF GENE POOL.

OBJECTIVES: To maintain the diverse genetic stock of sugarcane clones / varieties for its utilization breeding purposes.

RESEARCHERS: Muhammad Younus, Dr Muhammad Afzal and Zulfiqar Ali

PROJECT DURATION: Continuous nature (2015)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: Following varieties / strains along-with variety CPF-247 will be maintained as ratoon crop.

Country	**Nos.**	**Country**	**Nos.**
Australia	9	Puerto Rico	07

Bangladesh	3	Pakistan	103
Brazil	13	Philippines	01
China	02	Reunion	01
India	11	Taiwan	02
Mauritius	01	U.S.A.	113
Mexico	11	West Indies	23
		Total:	**300**

METHODOLOGY: The experiment will be kept as ratoon crop and brix will be with hand refrecto-meter.

PREVIOUS YEAR'S RESULTS The brix % ranged from 16 to 24.

7. TITLE: TAXONOMIC CLASSIFICATION OF CANE VARIETIES/CLONES.

OBJECTIVES: To study taxonomic characters of promising sugarcane clones for their identification.

RESEARCHERS: Muhamnmad Younus & Zulfiqar Ali

PROJECT DURATION: Continuous nature (2015)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: Final varietal trials (6 promising lines)

METHODOLOGY: The studies will be made on promising clones/varieties. Observations on taxonomic characters like inter-node, node, bud, leaves and cane etc. will be recorded.

PREVIOUS YEAR'S RESULTS The following twelve (12) clones were morphologically studied.
S2008-FD-17, S2008-M-34, S2008-M-55, SL-96-128, S2009-SA-8, S2009-SA-41, S2009-SA-57, S2009-SA-167, S2009-SA-111, S2009-SA-169, S2009-SA-171, S2009-SA-79

8. TITLE: STUDIES ON ECONOMICS TRAITS OF CLONES IN NURSERY- I.

OBJECTIVES: Evaluation of clones on the basis of qualitative and quantitative characters for high cane and sugar yields.

RESEARCHERS: Muhammad Ashfaq Nadeem, Abdul Ghaffar, Naeem Fiaz & Muhammad Akhlaq Mudassir

PROJECT DURATION: Continuous nature (2014-15)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

Layout	Augmented design (Non-replicated plots)
Plot size	4 m × 1.2 m
No. of clones	2574
Fertilizer	168-112-112 NPK Kg ha^{-1}
Time of planting	October/November - 2014.
Irrigation	Normal
Check	HSF-240, SPF-245, CPF-246, & CPF-247

METHODOLOGY: Single row of each clone will be planted and four control varieties will be repeated in each 20 clones group. Selection will be made on the visual judgment (cane growth, cane stand, lodging, pith, disease, insect pest attack) and quality performance by recording brix reading with the help of hand refracto-meter. Selected clones will be promoted to Nursery-II for further study.

PREVIOUS YEAR'S RESULTS:

Total clones	Promoted clones
977	300

9. TITLE: STUDIES ON ECONOMICS TRAITS OF CLONES IN NURSERY-II.

OBJECTIVES: Evaluation of clones on the basis of qualitative and quantitative characters for high cane and sugar yields.

RESEARCHERS: Muhammad Ashfaq Nadeem, Dr. Abdul Ghaffar, Naeem Fiaz & Muhammad Akhlaq Mudassir

PROJECT DURATION: Continuous nature (2014-15)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: Layout Augmented design

	(Non-replicated plots)
Plot size	4 m × 2.4 m
No. of clones	355
Fertilizer	168-112-112 NPK Kg ha^{-1}
Time of planting	October - 2014.
Irrigation	Normal
Check	HSF-240, SPF-245, CPF-246, & CPF-247

METHODOLOGY: Double row of each clone will be planted and four control varieties will be repeated after each 20 clones group. Selection will be made on the visual judgment (cane growth, cane stand, lodging, pith, disease, insect pest attack) and quality performance by recording brix reading with the help of hand refracto-meter. Selected clones will be promoted to Nursery-III for further study.

PREVIOUS YEAR'S RESULTS:

Total clones	Promoted clones
140	43

10. TITLE: **PRELIMINARY VARIETAL TRIAL (NURSERY-III).**

OBJECTIVES: Evaluation of different cane clones for high cane and sugar yields for further selection.

RESEARCHERS: Dr. Muhammad Yasin Ali, Dr. Muhammad Afzal and Rana Zulfiqar Ali

PROJECT DURATION: Continuous nature (2014-2015)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

No. of clones	47 (including check)
Layout	RCBD
Replications	3
Plot size	4 m x 3.6 m
Seed rate	50,000 TBS/ha
Time of planting	September – 2014

METHODOLOGY: Forty seven (47) clones were planted in 4 sets along with two check varieties i.e. HSF-240 and CPF-247 in September-2014. Out of which, 43 clones from Nursery-II were promoted for further study. Two clones (S2011-FD-18 and S2008-AUS-87) were received from Pathological trials. Two clones (HoTh-

2019 and HoTh-409) were collected from Sindh which have reported as first tolerant varieties.

In Set-I, II and III, 14 clones and in Set-IV, 5 clones alongwith 2 standard varieties were planted during September 2014. The selection criteria is based on growth habit, tillering, brix%, disease and insect pest attack. The crop will be raised by applying recommended cultural practices. The data regarding germination, tillering, cane count, cane and sugar yields will be recorded.

PREVIOUS YEARS RESULTS — Data is under processing.

11. TITLE: **SEMI FINAL VARIETAL TRIAL ON SUGARCANE.**

OBJECTIVES: To evaluate new sugarcane clones for high selection of high tonnage and sugar yield.

RESEARCHERS: Abbas Ali Gill, Muhammad Akhlaq Mudassir, Dr. Abdul Ghaffar and Zulfiqar Ali

PROJECT DURATION: Continuous nature (2015-2016)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: Expected No. of clones = 20

Layout	RCBD
Replications	5 (Two for periodic analysis)
Plot size	4 x 9.60 m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112 NPK Kg ha^{-1}
Check	HSF 240 & CPF 247
Time of planting	Spring - 2015

METHODOLOGY: It is the fourth selection stage of variety development programme. Trial will be consisting of clones promoted from Nursery-III. The selection is based on quantity and quality performance of the strains. The data regarding germination, tillering, cane count, cane yield, lodging, frost, insect pest and disease tolerance will be recorded. Periodic juice analysis will be conducted once a month in the laboratory from 15th October to 15th April to check the quality performance.

PREVIOUS YEAR'S RESULTS

Set – I

Sr. #.	Varieties/ promising lines	Germ. (%)	Tillers / plant	Cane count (000 ha^{-1})	Cane yield (t ha^{-1})	Sugar recovery (%) Av. (Oct-Jan)	Sugar Yield (t ha^{-1})
1.	S2008-FD-17	46.64 cde	1.08 cd	99.14 fg	86.86 f	10.37	9.00 e
2.	S2008-M-55	33.07 f	1.91 a	120.32 a	112.40 abc	9.41	10.58 d
3.	S2008-M-148	40.16 ef	0.87 d	104.86 def	106.14 bcd	9.87	10.48 d
4.	S2008-SA-8	51.97 abc	1.17 bcd	93.65 gh	94.17 ef	12.01	11.31 cd
5.	S2008-SA-41	50.46 abcd	1.88 a	117.25 a	111.03 abcd	11.75	13.05 b
6.	S2008-SA-67	46.26 bcd	1.39 bc	114.31 abc	114.14 ab	12.40	14.15 a
7.	S2008-SA-171	47.11 bcde	2.02 a	116.33 ab	116.88 a	11.25	13.14 b
8.	SL-96-128	54.05 ab	1.43 b	101.24 f	111.32 abc	10.28	11.44 cd
9.	SL-96-175	46.18 cde	1.19 bcd	91.88 h	102.11 de	9.11	9.30 e
10.	SL-97-142	57.41 a	1.03 d	102.64 ef	117.67 a	7.37	8.67 e
11.	HSF-240	43.63 de	2.09 a	110.81 bcd	104.99 cd	10.37	10.89 d
12.	CPF-247	52.89 abc	1.98 a	108.13 cde	107.64 bcd	11.35	12.21 bc
LSD value @ 0.05		7.204	0.337	6194	8.948	-	0.989

12. TITLE: **FINAL VARIETAL TRIAL**

OBJECTIVE: To study the performance of clones for high cane and sugar yield at final selection stage.

RESEARCHERS: Dr. Abdul Ghaffar, Muhammad Akhlaq Mudassir & Zulfiqar Ali

PROJECT DURATION: Continuous nature (2015-2016)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

No. of sets	2
Clones	20
Layout	RCBD
Replications	5 (Two for periodic analysis)
Plot size	4m × 9.6 m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112 NPK Kg ha^{-1}
Time of planting	Spring, 2015

METHODOLOGY: The trial consists of varieties promoted from semi-final varietal trial. The data on different yield parameters regarding germination, tillering, cane count, and cane yield will be recorded. Other characters like frost, drought, lodging, insect pests and disease tolerance will also be taken into

consideration. Periodic juice analysis will be done fortnightly from mid October to mid April for quality performance. The selection will be done on the basis of quantity and quality performance of the clones.

PREVIOUS YEAR'S RESULTS **Set 1**

Sr. No.	Name of clones/varieties	Germ. (%)	Tillers/ plant	Cane count (000 ha^{-1})	Yield (t ha^{-1})	Sugar Rec. (%) (Oct.-Jan.)	Sugar Yield (t ha^{-1})	Remarks
1.	S2006-SP-93	40.74 cd	2.38 ab	126.74 bcd	123.33 c	11.31	13.71 cd	Rejected due to Red rot
2.	S2006-US-272	39.82 d	1.90 bc	109.03 ef	128.00 bc	10.56	13.49 d	Retained
3.	S2006-US-658	62.96 a	1.26 d	115.97 de	159.33 a	10.63	16.94 a	Retained
4.	S2008-FD-19	35.88 d	2.64 a	147.57 a	143.00 b	10.19	14.58 bcd	Retained
5.	S2008-M-34	57.39 b	1.08 d	110.07 ef	132.67 bc	10.33	13.74 cd	Retained
6.	S2008-M-38	49.62 bc	1.43 cd	123.26 bcde	94.00 d	11.66	10.93 e	Rejected due to Red rot
7.	S2008-M-42	61.23 a	1.87 bc	132.29 bc	141.67 b	11.72	16.60 a	-do-
8.	S2008-AUS-107	63.43 a	1.34 cd	134.03 ab	129.00 bc	12.08	15.56 ab	Retained
9.	HSF-240 (Std.)	40.85 cd	2.44 ab	118.06 cde	129.67 bc	11.94	15.57 abc	-
10.	CPF-247 (Std.)	50.81 b	2.02 b	101.34 f	123.33 c	11.94	14.765 bcd	-
LSD at 0.05		9.015	0.579	14.174	15.914	-	1.817	

Set 2

Sr. No.	Name of clones/varieties	Germ. %	Tillers / plant	Cane count (000 ha^{-1})	Cane yield (t ha^{-1})	Sugar Rec. (%) (Oct-Jan)	Sugar Yield (t ha^{-1})	Remarks
1.	S2008-AUS-129	48.84 ab	1.34 cde	93.40 de	115.67 c	11.34	13.15 cd	Retained
2.	S2008-AUS-130	53.93 a	1.77 bcd	123.26 a	135.33 ab	11.56	15.65 ab	Retained
3.	S2008-AUS-133	50.69 ab	1.27 cde	96.86 de	144.00 a	11.66	16.80 a	Retained
4.	S2008-AUS-134	50.35 ab	1.84 bcd	126.74 a	148.33 a	10.40	15.42 ab	Retained
5.	S2008-AUS-138	48.96 ab	1.24 de	117.36 abc	136.00 ab	12.02	16.36 a	Rejected due to Red rot
6.	S2008-AUS-190	54.75 a	1.08 e	119.10 abc	150.33 a	8.94	13.44 cd	Rejected due to low recovery
7.	S2009-SA-57	53.35 a	1.74 bcde	107.29 bcd	136.00 ab	11.67	15.88 ab	Retained
8.	S2009-SA-79	28.59 c	1.79 bcd	92.36 e	123.33 bc	10.62	13.09 cd	Retained
9.	S2009-SA-111	47.34 ab	1.90 bc	116.32 abc	122.00 bc	11.88	14.48 bc	Retained
10.	S2009-SA-169	28.35 c	2.147 b	106.95 cd	136.00 ab	9.60	13.03 cd	Retained
11.	HSF-240 (Std.)	25.58 c	3.21 a	113.54 abc	116.00 c	10.96	12.71 d	-
12.	CPF-247 (Std.)	44.33 b	2.10 b	121.53 ab	110.67 c	11.92	13.20 cd	-
	LSD at 0.05	7.542	0.659	14.371	15.222	-	1.619	

13. TITLE: ZONAL VARIETAL TRIALS UNDER PARB PROJECT NO 163.

OBJECTIVE: To check the performance of promising sugarcane clones in different agro-ecological zones of Punjab.

RESEARCHJ WORKERS: Dr. Muhammad Afzal, Dr. Muhammad Ijaz Tabassum, M. Yasir Riaz and Zulfiqar Ali

PROJECT DURATION: Continuous Nature (2015-16)

TREATMENTS: Eight-advanced line, i.e., S2003 US-127, S2003 US-633, S2003 US-778, S2003-US-704, S2006 US-272, S2006 US-469, S2006 US-658 and S2008 FD-19 including four standard verities HSF-240, CPF-246, CPF-247 and CPF-248 were arranged in RCBD with the following specifications:

Row spacing: 2.5 feet
NPK: 168-112-112 kg/ha
Seed rate: 50000 TBS/ha
Weed control: Ametryn + Atrazine @ 2.5 kg/ha
Insect control: 20 kg Fipronil/ha at sowing
20 kg Fipronil/ha at 45 DAS
40 kg Fipronil/ha at 90 DAS

Planting Dates: First 3 Trials during Sept-Oct 2013
Remaining 12 Trials during Feb-March 2014
Harvesting Dates: Nov 2014-Feb 2015

Locations:

#	Location	Tehsil	District
1	Chak # 111/G.B.	Jaranwala	Faisalabad
2	Qadar Pur Ran	Multan	Multan
3	Mozu Mangatt	M.B. Din	M.B. Din
4	323/E.B.	Boraywala	Boraywala
5	Kot Ranjeet	Sheikhopura	Sheikhopura
6	Kot Addu	Mazafargarh	Mazafargarh
7	Rajanpur	Rajanpur	Rajanpur
8	247/R.B.	Faisalabad	Faisalabad
9	Lalian	Lalian	Chiniot
10	130/TDA	Liyyah	Liyyah
11	Mill Farm	Faisalabad	Faisalabad
12	Mozah Karyal	Kasur	Kasur
13	Chak # 57, Kot Allah Baksh	Kot Radah Kushan	Kasur
14	90/5.R	Haroonabad	Haroonabad
15	Toll Plaza	Mianwali	Mianwali

Performance of promising sugarcane varieties for cane yield (t ha^{-1}), sugar recovery (%), and sugar yield (t ha^{-1}) in outfield trials planted during Sept-Oct 2013

#	Variety	Germination %	Tillering	No. of canes (000/ha)	Cane yield (t/ha)	Sugar recovery (%)	Sugar yield (t/ha)
1	HSF-240	43.26 c	1.42 h	110.38 f	101.55 f	11.09	11.26 d
2	CPF-246	47.20 b	1.56 g	115.00 e	133.75 bc	12.08	16.16 ab
3	CPF-247	48.64 a	1.72 e	116.20 e	115.20 e	12.15	14.00 bcd
4	CPF-248	42.31 c	1.83 c	112.99 ef	112.99 e	12.10	13.67 bcd
5	S2003 US-127	41.23 d	1.35 i	121.47 d	136.05 b	12.25	16.67 ab
6	S2003 US-633	35.55 f	1.95 a	135.57 b	113.73 e	13.85	15.75 ab
7	S2003 US-778	29.78 i	1.65 f	124.75 cd	99.93 f	11.60	11.59 cd
8	S2003-US-704	39.87 e	1.89 b	127.80 c	128.80 bc	12.45	16.04 ab
9	S2006 US-272	47.56 b	1.78 d	125.24 cd	118.33 de	11.28	13.35 bcd
10	S2006 US-469	34.19 g	1.65 f	132.84 b	126.20 cd	11.89	15.01 bc
11	S2006 US-658	47.30 b	1.39 h	125.11 cd	158.83 a	12.01	19.08 a
12	S2008 FD-19	32.33 h	1.95 a	150.10 a	136.59 b	12.05	16.46 ab
LSD (0.05)		**1.0496**	**0.0365**	**4.3673**	**7.9598**	**-**	**3.6400**

Performance of promising sugarcane varieties for cane yield (t ha^{-1}), sugar recovery (%), and sugar yield (t ha^{-1}) in outfield trials planted during Feb-March 2013

#	Variety	Germination %	Tillering	No. of canes (000/ha)	Cane yield (t/ha)	Sugar recovery (%)	Sugar yield (t/ha)
1	HSF-240	40.23 ab	1.35 ab	106.90 g	99.60 f	11.01	10.97 g
2	CPF-246	44.09 a	1.49 ab	111.52 efg	131.80 b	11.98	15.79 bc
3	CPF-247	45.67 a	1.62 ab	112.72 efg	113.25 de	12.07	13.67 cdef
4	CPF-248	39.12 ab	1.73 ab	109.51 fg	111.04 e	12.01	13.34 defg
5	S2003 US-127	38.15 ab	1.27 b	117.99 def	134.10 b	12.19	16.35 ab
6	S2003 US-633	32.49 bc	1.87 a	132.09 b	111.78 e	13.79	15.42 bcde
7	S2003 US-778	26.84 cd	1.58 ab	121.27 cde	97.98 f	11.53	11.30 fg
8	S2003-US-704	36.99 abc	1.81 ab	124.32 bcd	126.85 c	12.37	15.69 bcd
9	S2006 US-272	44.81 a	1.68 ab	121.76 bcde	116.38 d	11.21	13.05 efg
10	S2006 US-469	31.58 bc	1.54 ab	129.36 bc	124.25 c	11.91	14.80 bcde
11	S2006 US-658	44.39 a	1.31 ab	121.63 bcde	156.88 a	11.98	18.79 a
12	S2008 FD-19	29.56 cd	1.87 a	146.62 a	134.64 b	11.99	16.14 b
LSD (0.05)		**10.429**	**0.5914**	**10.766**	**3.3347**	**-**	**2.4405**

14. TITLE **PERFORMANCE OF PROMISING SUGARCANE VARIETIES (AUTUMN SOWN).**

OBJECTIVES — To evaluate the variety having maximum yield potential and excellent quality characters sown in Autumn.

RESEARCHERS: — Dr. Muhammad Azhar Munir, Dr. Muhammad Afzal & Zulfiqar Ali

PROJECT DURATION — 2013-2015

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

A. <u>Varieties (8)</u>

V1 = S2006-SP-93, V2 = S2008-M-42,
V3=S2008-AUS-129, V4= S2008-AUS-130
V5= S2008AUS-184, V6= S2008-AUS-190,
V7=S2008-AUS-195 V8= HSF-240, (check)

Layout = RCBD
Plot size = 4m × 9.6 m
Replications = 3
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}
Date of planting = September - 2014

METHODOLOGY — All P & K was applied at planting while N will be applied in three splits. Necessary cultural and plant protection operations will be carried out as and when required. Data on germination, tillering, number of millable canes, cane girth, cane height and cane yield will be recorded. Quality parameters like pol%, brix% and commercial cane sugar % will also be recorded using standard procedures. Insect pest and disease data will also be recorded.

PREVIOUS YEARS RESULTS — Yield and quality parameters of different promising sugarcane varieties.

Varieties	Germin-ation %	Tillers/ plant	Cane count (000 ha^{-1})	Stripped cane yield (t ha^{-1})	Sugar recovery %	Sugar yield (t ha^{-1})
S2006-SP-93	38.00 d	1.55 bc	120.05 a	92.30 c	13.08	11.63 b
S2008-M-42	56.66 a	1.25 de	119.62 a	115.01 a	14.16	16.29 a
S2008-AUS-129	48.66 b	0.88 f	83.77 e	105.01 b	14.11	14.82 a
S2008-AUS-130	43.00 c	1.28 cd	115.44 ab	113.19 a	14.14	15.98 a
S2008-AUS-184	39.66 cd	2.01 a	109.72 bc	110.06 ab	14.19	15.62 a
S2008-AUS-190	42.33 cd	1.00 ef	101.89 cd	105.47 b	14.67	15.43 a
S2008-AUS-195	48.00 b	1.09 def	93.40 d	85.80 c	14.31	12.29 b
HSF-240	39.33 d	1.8 ab	96.62 d	104.43 b	14.36	15.02 a
LSD value @ 0.05	4.127	0.279	8.778	5.910	N.S.	2.068

15. TITLE — **NATIONAL UNIFORM VARIETAL YIELD TRIAL (1st YEAR).**

OBJECTIVES	To evaluate the adaptability of different sugarcane promising clones.
RESEARCHERS:	Dr. Javed Iqbal, Dr. Muhammad Afzal & Zulfiqar Ali
PROJECT DURATION	2014-2016
LOCATION	Sugarcane Research Institute, Faisalabad.
TREATMENTS	Clones: 6 S2006-SP-93, HOSG-31, CSSG-32, Thattha-910, YTTh-236, CPF-247 (check) Layout = RCBD Plot size = 5m × 4.8m Replications = 4 Seed rate = 50,000 TBS ha^{-1} Fertilizer = 168-112-112 NPK kg ha^{-1} Date of planting = September - 2014
METHODOLOGY	All P & K was applied at planting while N will be applied in three splits. Necessary cultural and plant protection operations will be carried out as and when required. Data on germination, tillering, number of millable canes, cane girth, cane height and cane yield will be recorded. Quality parameters like pol%, brix% and commercial cane sugar % will be recorded using standard procedures. Insect pest and disease data will also be recorded.
PREVIOUS YEARS RESULTS	New experiment.

16. TITLE **NATIONAL UNIFORM VARIETAL YIELD TRIAL (2nd YEAR).**

OBJECTIVES	To evaluate the adaptability of different sugarcane promising clones.
RESEARCHERS:	Dr. Javed Iqbal, Dr. Muhammad Afzal & Zulfiqar Ali
PROJECT DURATION	2014-2015
LOCATION	Sugarcane Research Institute, Faisalabad.
TREATMENTS	Clones: 6 S2007-AUS-384, NARC-1, NARC-2, CSSG-33, YTTh-53, CPF-246 (Check).

Layout = RCBD
Plot size = 5m × 4.8m
Replications = 4
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}
Date of planting = September - 2014

METHODOLOGY

All P & K was applied at planting while N will be applied in three splits. Necessary cultural and plant protection operations will be carried out as and when required. Data on germination, tillering, number of millable canes, cane girth, cane height and cane yield will be recorded. Quality parameters like pol%, brix% and commercial cane sugar % will be recorded using standard procedures. Insect pest and disease data will also be recorded.

PREVIOUS YEARS RESULTS:

Clones/Varieties	Germination (%)	Tillers/ Plant	Cane count (000 ha^{-1})	Cane diameter (cm)	Cane height (cm)	Cane yield (t ha^{-1})	Sugar recovery (%)	Sugar yield (t ha^{-1})
S2007-AUS-384	51.42 A	2.28 B	115.25 A	3.15 A	253.93 A	125.17 A	14.37	17.98 A
NARC-1	42.77 D	1.97 D	85.17 D	2.60 D	220.17 D	105.30 C	12.96	13.61 CD
NARC-2	35.52 F	2.13 C	67.80 F	2.17 F	163.98 F	77.80 E	13.85	10.78 E
CSSG-33	48.13 B	2.32 B	107.78 B	3.00 B	243.91 B	117.33 B	12.66	14.93 BC
YTTh-53	39.52 E	1.63 E	77.78 E	2.36 E	201.38 E	95.17 D	13.25	12.60 D
CPF-246 (Check)	45.68 C	2.42 A	95.22 C	2.75 C	231.48 C	112.67 B	14.16	16.02 B
LSD at 0.05	1.158	0.070	5.184	0.066	8.420	5.632	-	1.671

17. TITLE: **SCREENING HIGH FIBER SUGARCANE VARIETIES/CLONES FOR COGENERATION.**

OBJECTIVE: To find out high fiber sugarcane varieties/clones for cogeneration possessing high cane and sugar yield, resistant to insect pests and diseases.

RESEARCHERS: Hafiz Abdul Rauf, Dr. Abdul Ghaffar, Abbas Ali Gill, Dr. Muhammad Afzal & Zulfiqar Ali.

PROJECT DURATION: 2015-17

LOCATION: Sugarcane Research Institute. Faisalabad

TREATMENTS: Layout = RCBD
Replications = 3

Plot size	=	4m × 4.8m
Seed rate	=	50,000 TBS ha^{-1}
Fertilizer	=	168-112-112 NPK kg ha^{-1}
Date of planting	=	Feb/ March – 2015

METHODOLOGY

All varieties/clones will be analyzed for fiber percentage and other quality parameters like brix, pol, purity, CCS % and sugar recovery. The varieties selected possessing high fiber contents will be planted in an experiment. All the agronomic practices will be applied uniformly as per recommendation. The data regarding yield parameters, fiber contents and quality performance will be recorded accordingly.

PREVIOUS YEARS RESULTS: New experiment.

B. SUGARCANE AGRONOMY

1. TITLE: WEED CROP COMPETITION STUDIES IN SUGARCANE GROWN AT DIFFERENT ROW SPACINGS

OBJECTIVE: To minimize use of weedicide.

RESEARCHERS: Dr. Muhammad Saeed, Dr. Shahid Bashir & Zulfiqar Ali.

PROJECT DURATION: 2014-16

LOCATION: Sugarcane Research Institute. Faisalabad

Treatments:

A-Varieties (Main Plot)
(1) S2003-US-704 (2) CPF-248

B- Inter row distance (Sub Plot)
1) Row x Row distance = 4 feet (Recommended)
2) Row x Row distance = 2.5 feet

C-Weed control methods.
1) Ametryn + Atrazine pre-emerg. @ 1 Kg per acre (Common practice)
2) Ametryn + Atrazine pre-emerg. @ 1 Kg per acre +Sunstar@20 g per acre post emerg. 50 DAS (Recommended practice)
3) Control (weed check)

Layout = RCBD split split plot arrangement
Plot size = 5m × 4.8 m
Replications = 3
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}
Project Duration = 2014 - 2016

METHODOLOGY

The experiment will be planted in first week of March, 2015. Treatments will be applied as per treatment schedule. The weeds will be controlled as per treatments. All other agronomic practices will be kept normal. Data regarding germination, tillering, cane count, cane girth, cane length, weed count, cane yield and CCS t ha^{-1} will be recorded during the course of study.

PREVIOUS YEARS RESULTS:

Treatment	Weed Density (m^{-2})	Weed dry weight (g)	Cane height (m)	Cane yield (t ha^{-1})	Sugar yield (t ha^{-1})
A) VARIETIES					
V_1(S2003-US-704)	93.25	61.28	2.79	82.38	13.25
V_2 (CPF-248)	95.92	55.64	2.75	83.15	13.48
LSD(P≤0.05)	**N.S**				
B) ROW SPACING					
R_1 (4 feet)	96.48 a	56.15 a	2.73 a	83.15 a	13.35
R_2 (2.5 feet)	75.65 b	39.55 b	2.41 b	72.18 b	13.52
LSD(P≤0.05)	**13.78**	**15.6**	**0.18**	**8.15**	
C) WEED CONTROL METHODS					
W_1 (Ametryn+Atrazine pre-emergence	58.12 b	35.35 b	2.69 b	84.05 b	13.58
W_2(Ametryn+Atrazine pre-emergence + Sunstar 60 DAS	35.5 c	18.65 c	2.88 a	90.78 a	13.66
W_3 Control (Weedy check)	140.12 a	85.35 a	2.12 c	58.75 c	13.24
LSD(P≤0.05)	**18.78**	**18.6**	**0.16**	**5.18**	**N.S**
Variety x Row Spacing x Weed Control Methods					
$V_1R_1W_1$	69.54 c	38.32 c	2.81 b	85.46 b	13.45
$V_1R_1W_2$	54.44 ef	25.78 ef	2.89 a	88.48 a	13.68
$V_1R_1W_3$	118.35 a	84.58 a	2.39 ef	70.35 f	13.15
$V_1R_2W_1$	62.65 de	35.14 cd	2.45 ef	77.66 e	13.19
$V_1R_2W_2$	52.25 f	22.25 g	2.59 d	83.15 c	13.32
$V_1R_2W_3$	102.48 b	71.48 b	2.25 g	64.78 g	13.12
$V_2R_1W_1$	71.64 c	39.82 c	2.85 ab	84.62 bc	13.54
$V_2R_1W_2$	56.54 e	26.32 ef	2.91 a	87.46 ab	13.64
$V_2R_1W_3$	120.85 a	78.66 ab	2.49 e	69.14 f	13.24
$V_2R_2W_1$	64.25 d	37.78 c	2.43 ef	78.92 de	13.38
$V_2R_2W_2$	56.98 e	23.99 g	2.54 d	80.98 d	13.29
$V_2R_2W_3$	99.25 b	69.78 b	2.29 fg	63.92 g	13.16
LSD(P≤0.05)	**4.45**	**8.25**	**0.08**	**1.98**	**N.S**

2. TITLE: **INTEGRATED WEED MANAGEMENT IN SUGARCANE.**

OBJECTIVE: To find out the most effective combination of weed control in Sugarcane.

RESEARCHERS: Dr. Muhammad Saeed, Dr. Shahid Bashir & Zulfiqar Ali.

PROJECT DURATION: 2015-17

LOCATION: Sugarcane Research Institute. Faisalabad

Treatments: **Weed control methods.**

1. Dual gold (S-metolachlor) @ 800 ml / acre pre-em. (1-3 DAS) + one mechanical weeding (Tractor) 60 DAS + Earthing up 110-120 DAS.
2. Scope 80 W. P @ 1 kg / acre pre-em. (1-3 DAS) + one mechanical weeding (Tractor) 60 DAS + earthing up 110-120 DAS.
3. Scope 80 W. P @ 1 kg / acre pre-em. (1-3 DAS) + Sunstar or Orcus gold @ 20 g per acre post em. (40-50 DAS) + one mechanical weeding (Tractor) 60 DAS + Earthing up 110-120 DAS.
4. Fallisto gold @ 1000 ml / acre post em. (30-40 DAS) + one mechanical weeding (Tractor) 60 DAS + Earthing up 110-120 DAS.
5. Atrazine @ 1000 ml per acre post em. (30-40 DAS) + one mechanical weeding (Tractor) 60 DAS + Earthing up 110-120 DAS.
6. Manual control i.e hand weeding 30 DAS + one mechanical weeding (Tractor) 60 DAS + Earthing up 110-120 DAS.
7. Control (weed check)

Layout = RCBD
Plot size = 5m × 4.8 m
Row x Row Distance = 4 feet
Replications = 3
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}
Project Duration = 2015 - 2017

METHODOLOGY

The experiment will be laid out in Randomized Complete Block Design with three replications in first week of March, 2015. Treatments will be applied as per treatment schedule. Promising variety CPF-247 will be used as test variety. Earthing up will be done110-120 DAS. All other agronomic practices will be kept normal. Data regarding germination, tillering, cane count, cane girth, cane length, weed count, cane yield and CCS t ha^{-1} will be recorded during the course of study.

PREVIOUS YEARS RESULTS: New Experiment

3. TITLE: **EFFECT OF HARVESTING DATES ON RATOONINGABILITY OF DIFFERENT SUGARCANE VARIETIES / CLONES.**

OBJECTIVES: To evaluate the ratooning ability of different sugarcane varieties at various harvesting times.

RESEARCHERS: Dr. Shahid Bashir, Dr. Mahmood-ul-Hassan, Dr. Muhammad Yasin and Zulfiqar Ali

PROJECT DURATION: 2015-17 (repeated for second time)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

Layout	=	RCBD split plot arrangement
Plot size	=	4m × 4.8m
Repeats	=	3
Seed rate	=	50,000 TBS t ha^{-1}
Fertilizer	=	168-112-112 NPK kg ha^{-1}

A. Varieties (Main plots)

V_1 = S2006-FD-19 V_2 = S2006-US-272
V_3 = S2006-US-658 V_4 = S2003-US-127
V_5 = CPF-247 (Std.)

B. Harvesting dates. (Sub-plots)

HD_1 = 15 November HD_2 =15 December
HD_3 = 15 January HD_4 = 15 February
HD_5 = 15 March

METHODOLOGY: The crop will be sown in February – 2015. All phosphorus and potash will be applied at the time of planting. Nitrogen will be applied in 3 splits i.e. at completion of germination, tillering and earthing up. All other agronomic practices will be kept normal. The crop will be harvested at mentioned schedules. Ratooning ability of the varieties will be evaluated in the next year with 30% more fertilizer application.

PREVIOUS YEAR'S RESULTS:

Effect of harvesting dates on number of sprouts (000 ha^{-1}) of different sugarcane varieties / clones in ratoon crop

Varities / Clones	Harvesting dates of plant crop					Average
	15-Nov	15-Dec	15-Jan	15-Feb	15-Mar	
S2006 SP-93	91	59	92	163	156	112.4 ab
S2008 AUS-133	82	60	81	132	129	96.9 c
S2008 AUS-135	82	59	86	122	118	93.5 c
S2007 AUS-384	88	63	91	156	149	109.5 b
CPF-247	96	69	93	160	155	114.7 a
Average	87.9 c	62.3 d	88.7 c	146.6 a	141.6 b	

LSD value at 0.05 (Varieties = 5.0566, Harvesting dates = 2.7998 and H x D = 6.2606)

Effect of harvesting dates on no. of canes of different sugarcane varieties / clones in ratoon crop

Varieties / Clones	Harvesting dates of plant crop					Average
	15-Nov	15-Dec	15-Jan	15-Feb	15-Mar	
S2006 SP-93	66.7 hi	47 jk	69 ghi	107.3 bc	103.3 cd	78.7 b
S2008 AUS-133	62.3 i	41.3 k	62.3 i	98 de	95 e	71.8 c
S2008 AUS-135	69.7 gh	44 k	67.3 hi	95.7 e	91.7 e	73.7 c
S2007 AUS-384	72 fgh	46.7 jk	77.3 f	118 a	116.7 a	86.1 a
CPF-247	75.7 fg	53.3 j	77.7 f	116 a	114.3 ab	87.4 a
Average	69.3 c	46.5 d	70.7 c	107 a	104.2 b	

LSD value at 0.05 (Varieties = 4.9578, Harvesting dates = 2.6796 and H x D = 5.9917)

Effect of harvesting dates on cane yield (t ha^{-1}) of different sugarcane varieties / clones in ratoon crop

Varieties / Clones	Harvesting dates of plant crop					Average
	15-Nov	15-Dec	15-Jan	15-Feb	15-Mar	
S2006 SP-93	47 hi	32 k	49.5 ghi	75 c	73.7 c	55.4 d
S2008 AUS-133	57.7 ef	37.3 jk	59 ef	89 b	87.7 b	66.1 b
S2008 AUS-135	60.7 def	40 j	61.7 de	85 b	84 b	66.3 b
S2007 AUS-384	51 gh	33.3 k	54.3 fg	84.3 b	83.7 b	61.3 c
CPF-247	63 de	43.7 ij	67 d	97 a	96 a	73.3 a
Average	55.9 b	37.3 c	58.3 b	86.1 a	85 a	

LSD value at 0.05 (Varieties = 4.1775, Harvesting dates = 2.4001 and H x D = 5.3667)

Effect of harvesting dates on CCS (%) of different sugarcane varieties / clones in ratoon crop

Varieties / Clones	Harvesting dates of plant crop					Average
	15-Nov	15-Dec	15-Jan	15-Feb	15-Mar	
S2006 SP-93	15.18 a	13.53 cdef	14.6 abc	14.5 abcd	14.66 abc	14.49 a
S2008 AUS-133	14.3 abcd	14.76 abc	14.73 abc	15.05 ab	14.6 abc	14.69 a
S2008 AUS-135	14.38 abcd	13.83 abcdef	14.07 abcd	14.41 abcd	14.31 abcd	14.2 ab
S2007 AUS-384	13.51 cdef	12.55 ef	12.48 f	12.59 ef	12.69 ef	12.76 c
CPF-247	13.85 abcde	13.17 def	13.78 bcdef	13.76 bcdef	14.29 abcd	13.77 b
Average	14.24 a	13.57 b	13.93 ab	14.06	14.11 ab	

LSD value at 0.05 (Varieties = 0.6383, Harvesting dates = 0.6081 and H x D = 1.3597)

Effect of harvesting dates on CCS (t ha^{-1}) of different sugarcane varieties / clones in ratoon crop

Varieties / Clones	Harvesting dates of plant crop					Average
	15-Nov	15-Dec	15-Jan	15-Feb	15-Mar	
S2006 SP-93	7.11 gh	4.34 lm	7.19 gh	10.83 de	10.81 de	8.05 b
S2008 AUS-133	8.25 fg	5.52 kl	8.66 f	13.38 ab	12.79 abc	9.72 a
S2008 AUS-135	8.68 f	5.54 jkl	8.67 f	12.22 bc	12.02 cd	9.43 a
S2007 AUS-384	6.88 hi	4.19 m	6.79 hij	10.55 e	10.58 e	7.8 b
CPF-247	8.72 f	5.75 ijk	9.23 f	13.39 ab	13.7 a	10.16 a
Average	7.93 b	5.07 c	8.11 b	12.07 a	11.98 a	

LSD value at 0.05 (Varieties = 0.7831, Harvesting dates = 0.4870 and H x D = 1.0891)

4. TITLE: **PRODUCTIVITY OF SUGARCANE RATOON CROP UNDER VARIOUS AGRO-MANAGEMENT TECHNIQUES.**

OBJECTIVES: To study the effect of agro-technological manipulations for improving the productivity of sugarcane ratoons.

RESEARCHERS: Dr. Mahmood ul Hassan, Dr. Shahid Bashir, Dr. Muhammad Yasin and Zulfiqar Ali

PROJECT DURATION: 2013-16 (Two ratoons)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: Layout = RCBD
Plot size = 7m × 3.6m

Replications = 3
Variety = CPF-248
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}
(ratoon with 30% more nitrogen)

Treatments

T1: Farmer's practice (no cultural operations)
T2: Dismantling of ridges
T3: Dismantling of ridges + stubble shaving
T4: T3 + sub-soiling within rows
T5: T4 + interculturing within rows
T6: T5 + earthling up end of May
T7: T5 + earthing up end of June

METHODOLOGY: The crop was planted on 18-3-2013 and was harvested on 15-2-2014. Ratoon crop was raised by applying standard and uniform agronomic practices with 30% more nitrogen to all the treatments except one under study. The data on different yield parameters regarding sprouting, no. of canes and cane yield will be recorded. Quality parameters like pol %, brix % and commercial cane sugar % will also be recorded using standard procedures. First ratoon will be harvested at the end of February-2015 to avoid frosty conditions.

PREVIOUS YEAR'S RESULTS: Plant crop will be harvested at the end of February

5. TITLE: RATOONING POTENTIAL OF PROMISING SUGARCANE CLONES

OBJECTIVES: To evaluate ratooning ability of promising sugarcane lines for two repeated years by keeping standard ratoon crop management practices.

RESEARCHERS: Dr. Mahmood ul Hassan, Dr. Shahid Bashir, Dr.Muhammad Yasin and Zulfiqar Ali

PROJECT DURATION: 2014-17 (two ratoons)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: Layout = RCBD
Plot size = 4 x 9.6 M

Replications = 3
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}

VARIETIES

V_1 = S2006 US-272 V_2 = S2008 FD-19
V_3 = S2008 M-38 V_4 = S2008 M-42
V_5 = S2008 AUS-107 V_6 = S2008 AUS-129
V_7 = S2008 AUS-130 V_8 = S2008 AUS-133
V_9 = S2008 AUS-190 V_{10} = CPF-247 (Std.)

METHODOLOGY: The crop was planted on 25-2-2014. The uniform and standard agronomic practices were applied to all the treatments. Plant crop will be harvested at the end of February-2015 to avoid frost period for better sprouting. The standard ratoon crop management practices like stubble shaving, inter-culture and gap filling will be done alongwith 30% more nitrogen to the ratoon crop. The data on different yield parameters regarding sprouting, cane count, cane and sugar yield will be recorded. Quality parameters like pol %, brix % and commercial cane sugar % will also be recorded using standard procedures.

PREVIOUS YEAR'S RESULTS Plant crop will be harvested at the end of February.

6. TITLE: **PERFORMANCE OF ELITE PIPELINE VARIETIES UNDER DIFFERENT IRRIGATION REGIMES**

OBJECTIVE: To screen out the drought tolerant clone under semi arid conditions of Faisalabad.

RESEARCH WORKERS: **A):** Naeem Fiaz, Dr. Abdul Ghaffar & Zulfiqar Ali (SRI, Faisalabad)
B): Hafiz Saeed-ur-Rehman & Dr. Hafiz Muhammad Akram (ARI, Faisalabad)

PROJECT DURATION: (2015-17)

LOCATION: Agronomic Research Institute, Faisalabad

TREATMENTS:

A. Irrigation Levels:
I_1. 1.0 coefficient
I_2. 0.8 coefficients
I_3. 0.6 coefficient

B. Varieties:
V_1 S2003-US-127

V_2	S2003-US-704
V_3	S2005-US-54
V_4	S2006-US-272
V_5	S2008-FSD-19
V_6	S2008-AUS-129
V_7	CPF 247 (standard)
Layout	RCBD split plot arrangement
Replications	3
Plot size	9.6m × 4m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112 NPK (kg ha^{-1})

Date of planting: Spring 2015

METHODOLOGY: The trial will be laid out in RCBD with split plot arrangement having three repeats with a plot size of 9.6m × 4m. Three irrigation levels 1.0, 0.8 and 0.6 co-efficient will be kept in main plot while the clones in sub plot. Crop will be subjected to drought stress after formative stages. Agronomic data like germination (%), tillering, cane count (ha), cane yield (t/ha) and CCS (%) will be recorded by SRI's researchers. While the physiological parameters like leaf area index (LAI), photosynthetically active radiation (PAR), photosynthetic efficiency, canopy images, relative water contents (RWC), proline contents, sodium oxide dismutase (SOD) will be determined in collaboration with the researchers of Plant Physiology Section of ARI, during the course of study.

PREVIOUS YEAR'S RESULTS: New experiment

7. TITLE: **SUITABLE PLANTING TECHNIQUE FOR OPTIMUM PLANT POPULATION**

OBJECTIVE: To determine the best planting technique with most favorable plant population for obtaining higher cane yield.

RESEARCH WORKERS: Naeem Fiaz, Dr. Abdul Ghaffar, & Zulfiqar Ali

PROJECT DURATION: (2015-17)

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS: **A. Planting methods:**

P_1. 4 ft apart planting (Recommended)

P_2. 2.5 ft apart planting (Farmer practice)
P_3. Ladder planting (New technique)

B. Seed rate (ha^{-1}):

S_1 40000 TBS
S_2 50000 TBS
S_3 60000 TBS
S_4 70000 TBS

Variety/clone S2006-US-658
Layout RCBD split plot arrangement
Replications 3
Fertilizer 168-112-112 NPK (Kg ha^{-1})
Date of planting: Spring 2015

METHODOLOGY: The trial will be laid out in RCBD with split plot arrangement having three. Three planting techniques will be kept in main plot while the varying number of TBSs will be used in sub plots. In new technique, Ladder planting, sets will be placed across the length of rows. Data like germination (%), tillering, cane count (ha), cane yield (t/ha) and CCS (%) will be recorded at the time of during course of study.

PREVIOUS YEAR'S RESULTS: New experiment

8. TITLE: EFFECT OF DIFFERENT INTER-CROPS ON YIELD AND QUALITY OF SPRING PLANTED SUGARCANE.

OBJECTIVES: To explore the feasibility and scope of intercropping and to determine the effect of different associated legume and non-legume crop on the growth, yield and quality of spring sugarcane.

RESEARCHERS: **A.** Dr. M.Yasin, Mr. Mehmood-ul- Hassan Dr. Shahid Bashir and Zulfiqar Ali
B. Mr. Aamar Amin, Asstt. Botanist (Mash) &
Mr. Sajid Saeed, Asstt. Botanist (Mung)

PROJECT DURATION: 2014-2016

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

Layout	=	RCBD
Plot size	=	5 m × 8.4 m

Replications = 3
Variety/clone = S2003-US-633
Seed rate = 50,000 TBS ha^{-1}
Fertilizer = 168-112-112 NPK kg ha^{-1}

Treatments

T1: Sugarcane + two rows of mash
T2: Sugarcane + two rows of mung
T3: Sugarcane + one row of sunflower
T4: Sugarcane + two rows of sunflower
T5: Sugarcane + one row of maize fodder
T6: Sugarcane + two rows of maize fodder
T7: Sugarcane alone.

METHODOLOGY:

Sugarcane clone S2003-US-633 will be used. The crop will be sown 120 cm apart double row strips in Spring, 2015. The mash variety 'Arooj', mung variety 'Azri', sunflower and maize fodder will be intercropped in the month of March. Half seed rate of the recommended seed rate i.e. 25 kg, 25 kg, 5 kg and 100 kg ha^{-1} will be used, respectively. All other Agronomic practices will be kept uniform in all the treatments. A recommended dose of NPK will be applied @ 168-112-112 Kg NPK ha^{-1}. Statistical and economics of the sole as well as intercropped sugarcane will be calculated. During the study the following observation will be recorded:

MAIN CROP (Sugarcane)

- Germination %
- Tillering per plant
- Cane count ha^{-1}
- Cane yield t ha^{-1}
- CCS %
- Sugar yield t ha^{-1}

INTER CROP

- Seed yield of mash Kg ha^{-1}
- Seed yield of mung Kg ha^{-1}
- Seed yield of sunflower kg ha^{-1}
- Forage yield kg ha^{-1}

PREVIOUS YEAR RESULTS

Data is in progress.

9. TITLE:

EFFECT OF LEVELES AND TIME OF N APPLICATION ON SPRING PLANTED

SUGARCANE.

OBJECTIVE: To evaluate the performance of sugarcane lines under split application of Nitrogen in late conditions.

RESEARCHERS: Muhammad Akhlaq Mudassir, Dr. Abdul Ghaffar and Zulfiqar Ali

PROJECT DURATION: 2014-2016

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

A. **Fertilizer doses (NPK kg ha^{-1})**

F_1= 170-112-112
F_2= 227-112-112
F_3= 284-112-112
F_4= 341-112-112

B. Application of Nitrogen (Days after planting)

T_1=	45	75	90			
T_2=	45	75	90	120		
T_3=	45	75	90	120	150	
T_4=	45	75	90	120	150	180

Layout	RCBD Split plot arrangement
Replications	3
Plot size	4m × 9.6 m
Seed rate	50,000 TBS ha^{-1}
Variety	S2006-US-658
Time of planting	Spring - 2015

METHODOLOGY: The trial will be sown during Feb - Mar 2015. Recommended dose of P & K will be applied at planting and N will be applied according to the treatments. The data on different yield parameters regarding germination, tillering, cane count, cane length, cane diameter, cane yield and quality data like brix %, pol %, purity %, fiber % and sugar yield will be recorded.

PREVIOUS YEAR'S RESULTS

Treatments	**Germination %**	**Tillers plant^{-1}**	**Cane Count (000 ha^{-1})**	**Cane Yield (t ha^{-1})**	**Sugar recovery (%)**	**Sugar Yield (t ha^{-1})**
A): Nitrogen rates (NPK kg ha^{-1})						
F1	55.44 ab	0.86 b	91.13 b	117.83 c	13.23	15.59 c
F2	56.52 a	1.03 ab	93.39 ab	122.41 c	12.72	15.55 c
F3	47.36 b	1.21 a	96.77 ab	129.71 b	13.19	17.11 b
F4	61.08 a	1.14	103.11 a	144.49 a	12.65	18.23 a
LSD at 0.05	**8.246**	**0.211**	**10.024**	**6.779**	**-**	**0.935**
B): Time of application						
T_1:	51.71 b	1.11 a	91.58 b	118.45 c	13.05	15.46 b
T_2:	53.79 a	0.94 b	92.97 b	127.57 bc	12.97	16.51 ab
T_3:	55.82 ab	1.08 a	96.53 ab	130.09 ab	13.05	17.00 a
T_4:	54.08 ab	1.11 a	103.37 a	138.32 a	12.72	17.52 a
LSD at 0.05	**5.314**	**0.09**	**6.851**	**9.723**	-	**1.269**

Interaction (A × B)						
F_1T_1	60.28	0.74 c	95.49 bcde	118.75 de	13.36	15.87 cde
F_1T_2	57.92	0.74 c	90.28 cde	117.01 de	13.24	15.48 de
F_1T_3	51.43	1.00 cd	86.81 cde	119.30 de	13.13	15.68 cde
F_1T_4	52.16	0.95 cd	91.94 bcde	116.23 de	13.19	15.35 de
F_2T_1	49.99	1.09 abcd	81.60 e	105.41 e	13.06	13.77 e
F_2T_2	67.28	0.84 de	100.00 bc	131.94 bcd	12.66	16.71 bcd
F_2T_3	58.84	1.15 abcd	96.88 bcd	123.61 cde	12.86	15.91 cde
F_2T_4	49.99	1.05 bcd	95.07 bcde	128.67 bcd	12.32	15.83 cde
F_3T_1	43.82	1.28 ab	96.18 bcde	127.08 cd	13.25	16.85 bcd
F_3T_2	48.66	1.12 abcd	82.64 de	115.49 de	13.25	15.29 de
F_3T_3	46.76	1.13 abc	101.04 bc	137.50 bc	13.33	18.37 b
F_3T_4	50.20	1.30 ab	107.22 ab	138.78 bc	12.94	17.93 bc
F_4T_1	52.77	1.33 a	93.06 bcde	122.57 cde	12.55	15.34 de
F_4T_2	61.31	1.05 bcd	98.96 bc	145.83 b	12.74	18.56 ab
F_4T_3	66.25	1.04 bcd	101.39 bc	139.93 bc	12.91	18.05 bc
F_4T_4	63.99	1.15 abc	119.03 a	169.62 a	12.41	20.97 a
LSD at 0.05	N.S.	0.198	13.701	19.447	-	1.229

10. TITLE: **RESPONSE OF SUGARCANE TO P AND K UNDER DIFFERENT PLANTING TECHNIQUES.**

OBJECTIVE: To find out appropriate level of P & K nutrition under conventional and recommended planning methods for sugarcane crop.

RESEARCHERS: Dr. Abdul Ghaffar, M. Akhlaq Mudassir & Zulfiqar Ali

PROJECT DURATION: 2014-2016

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

A. <u>Planting Techniques:</u>

P_1. 120 cm apart rows (Standard)

P_2. 75 cm apart rows (Conventional)

B. <u>P&K levels</u>

	N	P	K (kg/ha)
F_1	168	0	0
F_2	168	112	0
F_3	168	0	112
F_4	168	56	56
F_5	168	112	112
F_6	168	168	168

Layout RCBD split plot arrangement

Replications 4
Plot size 6 m × 4 m
Seed rate 50,000 TBS ha^{-1}
Variety S2006-US-272
Time of planting: Spring- 2015

METHODOLOGY:

Two planting techniques will be kept in main plot while the P and K levels will be randomize in sub plots. Data regarding germination, tillering, cane girth, cane length, cane count, cane and sugar yield t ha^{-1} will be recorded during the course of study.

PREVIOUS YEAR'S RESULTS:

Treatments	Germination %	Tillers plant^{-1}	Cane Count (000 ha^{-1})	Cane Yield (t ha^{-1})	Sugar recovery (%)	Sugar Yield (t ha^{-1})
A): Planting technique						
P_1: 4 feet apart	39.24	1.47	89.11	126.13 a	11.34	14.31 a
P_2: 2.5 feet apart	34.32	1.87	90.88	102.21 b	11.33	11.58 b
LSD at 0.05	**N.S.**	**N.S.**	**N.S.**	**6.563**	**-**	**0.760**
B): P & K level						
F_1:	37.84	1.69	87.47	108.13 c	11.13	12.02 c
F_2:	36.86	1.59	88.42	110.12 c	11.26	12.39 c
F_3:	36.58	1.65	88.85	110.25 c	11.34	12.50 c
F_4:	36.66	1.66	91.20	115.88 b	11.40	13.21 b
F_5:	35.10	1.72	91.88	118.88 ab	11.41	13.56 ab
F_6:	37.64	1.68	92.14	121.75 a	11.48	13.97 a
LSD at 0.05	N.S.	N.S.	N.S.	5.568	-	0.629
Interaction	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

C. SUGARCANE TECHNOLOGY

1. TITLE: **QUALITY EVALUATION OF SUGARCANE CLONES AT VARIOUS STAGES OF VARIETY EVOLUTION.**

OBJECTIVES: Evaluation of samples of sugarcane clones for juice quality in order to assess the stage of maturity.

RESEARCHERS: Irfan Rasheed, Abdul Ghaffar, Ghulam Abbas, Aamer Sattar & Zulfiqar Ali

PROJECT DURATION: 2015-2016

LOCATION: Sugarcane Research Institute, Faisalabad

TREATMENTS:

1. Final varietal trial set-I.
2. Final varietal trial set-II
3. Semi-final varietal trial set-I.
4. Semi-final varietal trial set-II.

METHODOLOGY: The juice analysis of the cane varieties will start in four sets in October and ends in April of next year for set-I and set-II of final varietal trial while in March for semi-final varietal trial (set-I & II). The data will be recorded for brix%, pol%, purity% and CCS% of the cane juice.

PREVIOUS YEAR'S RESULTS: **Final varietal trial (CCS %) Set-I.**

Varieties	Average (Oct to April 2013-14)

	Brix%	Pol%	Purity%	CCS%
S2008-AUS-129	19.43	17.09	87.67	12.94
S2008-AUS-130	19.65	16.98	86.01	12.71
S2008-AUS-133	19.40	17.30	88.89	13.22
S2008-AUS-134	19.09	16.28	84.97	12.09
S2008-AUS-135	18.89	16.44	87.26	11.83
S2008-AUS-138	19.34	17.31	89.23	13.25
S2008-AUS-172	20.36	17.93	87.85	13.58
S2008-AUS-178	19.00	16.60	87.08	12.51
S2008-AUS-184	19.19	16.57	85.66	12.40
S2008-AUS-190	18.11	15.58	85.38	11.63
S2008-AUS-195	19.32	17.13	88.13	13.04
HSF-240 (Std.)	19.58	17.09	87.02	12.88
CPF-247 (Std.)	19.59	16.92	86.07	12.65

Final varietal trial (CCS %) Set-II.

Varieties	Average (Oct to April 2013-14)			
	Brix%	Pol%	Purity%	CCS%
S2006-SP-93	19.72	17.22	86.95	12.97
S266-US-272	18.77	16.27	86.48	12.20
S266-US-469	19.21	16.80	87.22	12.67
S266-US-658	19.03	16.44	86.26	12.31
S2007-AUS-384	18.41	15.68	84.86	11.63
S2008-FD-19	19.54	16.90	86.24	12.66
S2008-M-38	20.02	17.68	88.17	12.71
S2008-M-42	20.20	18.23	88.56	13.69
S2008-M-56	17.42	14.40	84.25	10.99
S2008-AUS-107	19.54	17.19	87.61	13.01
HSF-240 (Std.)	19.85	17.36	87.21	13.09
CPF-247 (Std.)	19.48	17.11	87.54	12.94

Semi Final varietal trial (CCS %) Set-I.

Varieties	Average (Oct to April 2013-14)			
	Brix%	Pol%	Purity%	CCS%
S2008-FD-17	17.65	15.41	87.10	11.61
S2008-M-34	17.67	15.49	87.30	11.71
S2008-M-55	16.47	13.85	83.57	10.18
S2008-M-69	16.14	13.14	80.58	9.44
S2008-M-76	16.91	14.22	83.52	10.46
S2008-M-79	15.07	11.69	76.82	8.10
S2008-M-80	16.80	13.69	80.52	9.84
SL-96-128	16.70	14.01	83.46	10.28
SL-96-234	16.92	13.92	81.73	10.07
SL-96-278	16.61	13.52	80.64	9.71
HSF-240 (Std.)	18.90	16.16	85.07	12.02

CPF-247 (Std.)	19.41	17.09	87.91	12.95

Semi Final varietal trial (CCS %) Set-II.

Varieties	Average (Oct to April 2013-14)			
	Brix%	**Pol%**	**Purity%**	**CCS%**
S2009-SA-8	19.62	17.67	89.94	13.58
S2009-SA-41	18.62	16.63	88.99	12.71
S2009-SA-57	17.96	15.93	88.34	12.13
S2009-SA-67	18.97	16.88	88.80	12.87
S2009-SA-79	17.25	15.31	88.42	11.65
S2009-SA-111	20.05	17.80	88.66	13.56
S2009-SA-169	18.10	15.90	87.48	12.03
S2009-SA-171	17.22	15.18	88.02	11.51
HSF-240 (Std.)	19.26	16.62	86.18	12.43
CPF-247 (Std.)	19.03	16.73	87.80	12.66

2. **TITLE:** **SCREENING OF PROMISING SUGARCANE CLONES FOR GUR QUALITY.**

OBJECTIVES: To study the new promising cane clones for their gur quality.

RESEARCHERS: Aamer Sattar, Irfan Rasheed, Ghulam Abbas & Zulfiqar Ali.

PROJECT DURATION: 2015-17

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS: Varieties / Promising Clones;
S2006-US-272
S2006-US-658
S2008-US-130
S2008-US-133
CPF-248 (Standard)

Planting Time Spring - 2015
Design RCBD
Plot Size 4.0m × 9.6m

METHODOLOGY: Crop will be planted in RCBD arrangement in Spring -2015 and harvested in Spring -2016.
Gur will be prepared according to the procedure laid down in the book Gur Monograph (S. C. Roy-1951). The gur so prepared will be evaluated based on physical and chemical factors. Storage behavior of gur will be judged from

changes in moisture, pol, ash, color and reducing sugars after 90 days.

PREVIOUS YEAR'S RESULTS:

Pre-Planting Soil Status :

Determinations	Soil Depth	
	0-15 cm	15-30 cm
1. Soil Texture	Loam	Loam
2. EC (mS/cm)	0.94	0.74
3. pH	8.4	8.5
4. Nitrogen (%)	0.047	0.037
5. Available-P (ppm)	10.9	7.5
6. Available-K (ppm)	140	110
7. Organic Matter (%)	0.78	0.57

Cane Juice Composition :

Varieties	Extraction (%)	Brix (%)	Pol (%)	Purity (%)	Fiber (%)	CCS (%)	Recovery (%)
1. CPF-247(Std.)	63.72 a	23.40 c	20.75 c	88.67	14.10 c	15.48 b	14.55 b
2. S2003-US-127	60.19 d	24.19 b	21.34 b	88.21	15.75 b	15.54 b	14.60 b
3. S2003-US-114	60.56 c	23.28 c	20.72 c	89.02	16.55 a	15.02 c	14.12 c
4. S2003-US-633	61.73 b	22.00 d	19.80 d	90.02	14.05 c	14.92 c	14.03 c
5. S2003-US-778	58.31 e	24.99 a	22.23 a	88.95	16.70 a	16.07 a	15.11 a
LSD Value:	0.3405	0.3408	0.0337	N.S.	0.1915	0.1598	0.1530

Recovery of Gur :

Varieties	Gur (%) Juice	Gur (%) Cane
1. CPF-247(Std.)	19.86 c	12.65 ab
2. S2003-US-127	20.74 b	12.48 bc
3. S2003-US-114	19.26 d	11.66 d
4. S2003-US-633	19.96 c	12.32 c
5. S2003-US-778	22.22 a	12.95 a
LSD Value:	0.1947	0.3023

Analysis of Gur (Physico-Chemical):

Varieties	Appearance		Color (Colorimetric Units)		Pol (%)	
	B.S	A.S	B.S	A.S	B.S	A.S
1. CPF-247(Std.)	Creamy L. Brown	Shiny Brown	33.66 c	53.66 b	71.31 c	71.29 c
2. S2003-US-127	Golden Brown	Brown	35.83 b	56.49 a	73.60 b	73.72 b
3. S2003-US-114	Creamy D. Golden	D. Golden Brown	39.33 a	50.83 c	69.66 d	69.58 d
4. S2003-US-633	Shiny G. Brown	Shiny D. Brown	34.33 c	47.32 d	68.19 e	68.22 e

5. S2003-US-778	Light Brown	Brown	32.33 d	40.66 e	76.00 a	76.07 a
LSD Value:	-	-	1.2778	2.3041	0.3167	0.1468

* BS = Before Storage AS = After Storage

Varieties	**Moisture (%)**		**Mineral Matter (%)**		**Reducing Sugar (%)**		**Net Rendements (%)**	
	B.S	**A.S**	**B.S**	**A.S**	**B.S**	**A.S**	**B.S**	**A.S**
1. CPF-247(Std.)	6.35 a	3.26 a	3.04 b	3.05 b	7.16 a	7.21 a	61.11 d	61.03 d
2. S2003-US-127	5.09 b	2.03 d	3.12 b	3.11 b	6.34 b	6.34 c	64.13 b	64.27 b
3. S2003-US-114	5.37 b	2.25 c	2.86 c	2.88 c	5.14 c	5.14 d	61.66 c	61.56 c
4. S2003-US-633	5.23 b	2.13 cd	2.61 d	2.63 d	7.04 a	6.95 b	58.53 e	58.64 e
5. S2003-US-778	6.18 a	3.09 b	3.27 a	3.25 a	6.47 b	6.41 c	66.26 a	66.41 a
LSD Value:	0.3123	0.1347	0.1472	0.0828	0.2077	0.1287	0.4875	0.2227

* BS = Before Storage AS = After Storage

3. **TITLE:** **EFFECT OF NPK DOSES ON YIELD AND QUALITY OF PROMISING SUGARCANE CLONES.**

OBJECTIVES: To determine the various levels of NPK on yield and quality parameters of various promising sugarcane clones.

RESEARCHERS: Aamer Sattar, Ghulam Abbas and Zulfiqar Ali.

PROJECT DURATION: 2015-2017

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS: Fertilizers (Kg ha^{-1})

Treatments	**Fertilizers (Kg ha^{-1})**		
	N	**P_2O_5**	**K_2O**
T_1	126	84	84
T_2 (Std.)	168	112	112
T_3	210	140	140
T_4	252	168	168

Clones S2006-US-272 S2008-US-130
S2008-US-133 S2008-FD-19

Planting Time Spring -2015
Design RCBD Split Plot arrangement
Plot Size 4.0m × 9.6 m
Seed Rate 50,000 TBS ha^{-1}

METHODOLOGY:

Crop will b
Spring -201
at 45 & 9
according to
Sugar yield
done before

PREVIOUS YEAR'S RESULTS:

New experi

4. **TITLE:** **IMPACT OF HUMIC ACID ON YIELD AND JUICE QUALITY OF SUGARCANE.**

OBJECTIVES: To study the effect of Humic Acid application (granular & liquid) along with various doses of NPK on the yield and quality parameters of sugarcane.

RESEARCHERS: Irfan Rasheed, Aamer Sattar and Zulfiqar Ali.
PROJECT DURATION: 2014-2016

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS: Fertilizers (Kg ha^{-1})

Treatments	Fertilizers (Kg ha^{-1})			H. Acid (Kg/L ha^{-1})
	N	P_2O_5	K_2O	
T_1 (Std.)	168	112	112	00.00
T_2 (100 %)	168	112	112	7.50 Kg
T_3 (75 %)	126	84	84	7.50 Kg
T_4 (75 %)	126	84	84	11.25 Kg
T_5 (50 %)	84	56	56	7.50 Kg
T_6 (50 %)	84	56	56	11.25 Kg
T_7 (100 %)	168	112	112	12.50 Lit
T_8 (75 %)	126	84	84	12.50 Lit
T_9 (75 %)	126	84	84	18.75 Lit
T_{10} (50 %)	84	56	56	12.50 Lit
T_{11} (50 %)	84	56	56	18.75 Lit

Clone S2003-US-778
Planting Time Spring-2015

METHODOLOGY:

Design RCBD split plot arrangement

Determinations	Soil Depth	
	0-15 cm	15-30 cm
1. Soil Texture	Loam	Loam
2. EC (mS/cm)	1.49	1.46
3. pH	8.4	8.4
4. Nitrogen (%)	0.049	0.035
5. Available-P (ppm)	7.2	4.5
6. Available-K (ppm)	120	120
7. Organic Matter (%)	0.98	0.70

Plot Size 4.0m × 9.6m

Seed Rate 50,000 TBS ha^{-1}

PREVIOUS YEAR'S RESULTS:

Crop will be planted according to Split Plot arrangement in Spring-2015. Fertilizers will be applied according to the treatments. Humic acid (granular) will be applied with NPK at planting while humic acid (liquid) will be sprayed twice on soil before planting. All the cultural and agronomic practices will be kept same for all the treatments according to production technology. Germination and tillering data will be recorded at 45 & 90 DAP respectively while Cane Count, Cane Yield, CCS and Sugar yield will be recorded at harvest. Soil analysis will be done before planting and after harvesting of the crop.

Pre-Planting Soil Status

Effect of Humic Acid application on yield and quality parameters

Treatments NPK+HA (Kg ha^{-1})	Germination (%)	Tillers (Per Plant)	Plant Height (cm)	Cane Girth (cm)
T1 =NPK=100%+00.00 (168-112-112) Std.	46.18 abcd	1.38 bcdef	254.0 cd	2.28 abcd
T2 = NPK=100%+07.50 Kg	50.52 a	1.51 a	265.0 a	2.37 a
T3 = NPK=75% +07.50 Kg	47.22 abc	1.42 abcd	258.0 bc	2.32 abc
T4 = NPK=75% +11.25 Kg	49.30 ab	1.48 ab	264.6 a	2.36 a
T5 = NPK=50% +07.50 Kg	43.75 bcde	1.33 defg	247.2 e	2.23 abcd
T6 = NPK=50% +11.25 Kg	45.83 abcd	1.36 cdef	252.2 d	2.26 abcd
T7 = NPK=100%+12.50 L	48.09 abc	1.45 abc	260.8 ab	2.35 ab
T8 = NPK=75% +12.50 L	41.67 cde	1.29 efg	241.4 f	2.18 bcd
T9 = NPK=75% +18.75 L	46.52 abcd	1.39 bcde	257.2 bc	2.29 abcd
T10= NPK=50% +12.50 L	38.89 e	1.24 g	230.2 g	2.13 d
T11= NPK=50% +18.75 L	40.28 de	1.27 fg	239.2 f	2.16 cd

LSD-Value	6.5246	0.1138	4.9824	0.1775

Treatments NPK+HA (Kg ha^{-1})	Biomass Yield (t ha^{-1})	Cane Count (ha^{-1})	Sugarcane Yield (t ha^{-1})	CCS (%)	Sugar Recovery (%)
T1 =NPK=100%+00.00 (168-112-112) Std.	147.92 de	143752 b	104.43 c	14.03	13.19
T2 = NPK=100%+07.50 Kg	169.53 a	156252 a	127.34 a	14.40	13.54
T3 = NPK=75% +07.50 Kg	149.22 cd	145835 b	116.67 b	14.06	13.21
T4 = NPK=75% +11.25 Kg	157.81 b	148439 b	123.44 ab	14.25	13.40
T5 = NPK=50% +07.50 Kg	142.19 efg	119793 d	100.52 cd	13.82	12.99
T6 = NPK=50% +11.25 Kg	144.27 def	131773 c	102.34 c	14.01	13.17
T7 = NPK=100%+12.50 L	154.69 bc	146877 b	121.35 ab	14.22	13.37
T8 = NPK=75% +12.50 L	138.02 fgh	114585 d	098.44 cd	13.76	12.94
T9 = NPK=75% +18.75 L	148.18 de	145835 b	104.17 c	14.03	13.19
T10= NPK=50% +12.50 L	134.12 h	104168 e	088.02 e	13.62	12.81
T11= NPK=50% +18.75 L	135.94 gh	105731 e	092.71 de	13.71	12.89
LSD-Value	6.3729	5459.1	8.1281	NS	NS

5. **TITLE** **EFFECT OF ZINC ON GROWTH AND JUICE QUALITY OF UPCOMING CANE GENOTYPE S2006-US-658.**

OBJECTIVE To investigate the impact of Zinc application on yield and quality parameters of upcoming sugarcane genotype (S2006-US-658).

RESEARCHERS Ghulam Abbas, Irfan Rasheed, Aamer Sattar & Zulfiqar Ali.

DURATION 2015-17

LOCATION Sugarcane Research Institute, Faisalabad.

TREATMENTS Fertilizers (Kg ha^{-1})

Treatment	NPK (Kg ha^{-1})	Zinc Sulphate (Kg ha^{-1})
T_1	168-112-112	0.0
T_2	168-112-112	5.0
T_3	168-112-112	10.0
T_4	168-112-112	15.0
T_5	168-112-112	20.0

Layout: RCBD split plot arrangement
Replications: 3
Plot size 4m × 9.6m
Planting time: Spring, 2015

Seed rate: 50,000 TBS/ha
Clone: S2006-US-658

METHODOLOGY

Crop will be planted in RCBD split plot arrangement in Spring -2015. Fertilizers will be applied according to the treatments. All the cultural and agronomic practices will be conducted according to the production technology. Germination and tillering data will be recorded at 45 & 90 DAP respectively while Cane Count, Cane Yield, CCS and Sugar recovery will be recorded at harvest.

PREVIOUS YEAR'S RESULTS

New Experiment.

D. SUGARCANE PATHOLOGY

1. TITLE **SCREENING OF SUGARCANE CLONES AGAINST RED ROT *(COLLETOTRICHUM FALCATUM WENT).***

OBJECTIVE — To find out resistance in sugarcane Lines/clones against red rot.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan, Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Clones:	15
Layout:	Augmented design
Plot size:	3m × 2.4 m
Check varieties:	Co-1148, S2003-US-718 & SPSG-394

METHODOLOGY — 15 clones of sugarcane were planted in the month of September along with three check varieties. Inoculations of standing canes will be done by inoculating lower internodes during July-August using plug technique @ 20-25 spores/microscopic field. The inoculated stalks will be harvested after two months of inoculation and spread of the disease in the form of internal lesions/spots will be recorded on the basis of Srinivasan and Bhat's scale (0-9).

Rating scale for red rot disease of sugarcane (Srinivasan – 1961)

0 – 2	=	Resistant
2.1 – 4	=	Moderately Resistant
4.1 – 6	=	Moderately Susceptible
6.1 – 8	=	Susceptible
8.1 – 9	=	Highly Susceptible

PREVIOUS YEAR'S RESULTS — Out of 45 lines, 23 were found resistant, 12 moderately resistant, 02 moderately susceptible and 08 susceptible.

RESISTANT LINES — S2008-FD-14, S2009-AUS-107, S2008-M-79, S2008-M-69, S2008-AUS-133, S2008-AUS-138, S2008-AUS-129 and S2008-AUS-184.

MODERATELY RESISTANT	S2008-FD-19, S2006-US-658, S2008-AUS-134 & S2008-AUS-135
MODERATELY SUSCEPTIBLE	S2007-AUS-375, S2006-US-832
SUSCEPTIBLE:	S2006-SP-93, S2008-M-54, CPSG-2713, and S2008-M-42 & CPSG-33

2. TITLE **SCREENING OF SUGARCANE NURSERIES (II & III) AGAINST RED ROT.**

OBJECTIVE	To screen out resistant lines against Red rot.
RESEARCHERS:	Hafiz Muhammad Walayat Ali Khan, Dr, Muhammad Abdul Shakoor & Zulfiqar Ali
DURATION	Continuous nature (2015-16)
LOCATION	Sugarcane Research Institute, Faisalabad.
TREATMENTS	Inoculation to T_1 = Nursery-II = 140 Clones T_2 = Nursery-III = 31 Clones
METHODOLOGY	Inoculation of lower inter-nodes of standing canes will be done during July-August by plug technique. The inoculated stalks will be harvested after two months of inoculation and spread of the infection will be recorded using 0 – 9 disease rating scale.
PREVIOUS YEAR'S RESULTS	177 (168+09) clones were screened to search out the source of resistance to Red Rot. Among those 91 clones were found to be resistant, 31 moderately resistant, 11 moderately susceptible and 44 susceptible to the disease.
RESISTANT LINES:	S2011-SL-62, S2011-FD-25, VMC-84-524, S2011-SL-809, VMC 84-947 & M-1246-84
MODERATELY RESISTANT:	S2011-SL-257, S2011-SL-361, SL-97-142, SL89-2227, SL98-2535 & S2011-SL-175
MODERATELY SUSCEPTIBLE:	SL-93-697, S2011-SL-847, S2011-SL-137, S-2011-SL-51, S2011-SL-813, S2011-SL-626.
SUSCEPTIBLE:	S2011-SL-111, S2011-SL-71, S2011-SL-33, S2011-

SL-211, M-1176-77, SL-95-4033, SL-89-309 & S2011-SL-60.

3. TITLE **SCREENING OF SUGARCANE CLONES OF VARIETAL TRIALS (CO-ORDINATED or NUVYT, SEMI-FINAL AND FINAL) AGAINST RED ROT (*COLLETOTRICHUM FALCATUM WENT.*)**

OBJECTIVE — To screen out resistant clones against Red rot.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan, Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Inoculation to

E_1 = Coordinated trial
- a. 1st Year = 14 clones
- b. 2nd Year = 15 clones

E_2 = Semi-final trial = 16 clones

E_3 = Final varietal trial (Set-I-II) = 22 clones

METHODOLOGY — Inoculations of standing canes will be done using plug technique during July-August. The inoculated stalks will be harvested after two months of inoculation and spread of the infection will be recorded.

PREVIOUS YEAR'S RESULTS — 67 clones were screened to search out the source of resistance to red rot. Among those, 35 clones were found resistant, 21 moderately resistant, 03 moderately susceptible and 08 susceptible to the disease.

RESISTANT CLONES: — SPSG-24, S2008-AUS-138, SL-96-168, SL-96-278 S2008-AUS-129, S2008-AUS-190, S2008-M-69, S2008-FD-17, CPSG-2875 & S2008-AUS-133.

MODERATELY RESISTANT — S2006-US-469, YTTh-55, S2009-SA-111, CSSG-1239, S2008-SA-57, HOSG-31, S2005-US-658.

MODERATELY SUSCEPTIBLE — BPTh-804, S2008-M-42

SUSCEPTIBLE: — CPSG-2713, CSSG-32, Thattha-719

4. TITLE **SCREENING OF SUGARCANE CLONES AGAINST WHIP SMUT *(USTILAGO SCITAMINEA SYD).***

OBJECTIVE — To screen out sugarcane lines against whip smut.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan,
Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Lines: 15
Layout: Augmented design
Plot size 3m × 2.4 m
Check clones: S2003-US-618, CPSG-2713 & S2006-US-832

METHODOLOGY — 15 clones of sugarcane were dipped in spore suspension of whip smut (4 g spores per litter water) for half an hour and planted in September-2014 along with check. The paste method of inoculation at a concentration of 2g spores/2 ml water will also follow in the month of -March. The disease incidence will be recorded by counting the diseased canes.

Rating scale for Whip Smut disease of s.cane (%)

0 – 5	=	Resistant
5.1 – 15	=	Moderately Resistant
15.1 – 30	=	Moderately Susceptible
Above 30	=	Susceptible

PREVIOUS YEAR'S RESULTS — Out of 45 clones, 24 were found resistant and 14 moderately resistant, 04 moderately susceptible and 03 were susceptible.

RESISTANT VARIETIES — S2008-FD-19, S2008-M-53, S2008-M-38, S2003-US-633, S2006-US-658, S2008-AUS-133, S2008-AUS-190,S2008-AUS-130, S2008-M-79 S2009-AUS-107

MODERATELY RESISTANT — S2008-AUS-129,S2008-AUS-138, YTTH-55, S2008-M-49, S2008-AUS-134.

MODERATELY SUSCEPTIBLE — S2007-AUS-375,S2008-AUS-178, S2007-AUS-384, S2006-US-832

SUSCEPTIBLE — S2008-AUS-135, S2008-FD-14, CPSG-2713

5. TITLE **SCREENING OF SUGARCANE CLONES AGAINST POKKAH BOENG *(FUSARIUM MONILIFORME SCHELDON).***

OBJECTIVE — To screen out resistant/tolerant clones against Pokkah Boeng disease.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan, Dr, Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Lines: 15
Layout: Augmented design
Plot size 3m × 2.4 m
Check clones: BF-162, CSSG-212 & CPSG-2875

METHODOLOGY — 45 clones of sugarcane were planted along with the check varieties during the month of September-2014. The inoculation of the growing point will be made during the month of July @ $2x10^3$ spores/microscopic field. Disease incidence will be recorded on the basis of leaf infection and malformation of the top/node of canes.

Rating scale for Pokkah boeng disease (%)

0 – 2	=	Highly Resistant
3 – 8	=	Resistant
9 – 23	=	Moderately Resistant
24 – 40	=	Moderately Susceptible
41 – 50	=	Susceptible
Above 50	=	Highly Susceptible

PREVIOUS YEAR'S RESULTS — Out of 45 clones 36 were found resistant 05 were found moderately resistant and 04 were found moderately susceptible.

RESISTANT LINES — S2008-FD-19, YTTh-55, S2008-AUS-130, S2008AUS-184, S2008-AUS-138, S2006-US-272, S2006-US-658, S2008-M-79, S2006-AUS-59, S2008-AUS-133.

MODERATELY RESISTANT — S2008-AUS-135, S2008-AUS-190, S2008-M-54, S2007-AUS-281 & CSSG-212.

MODERATELY SUSCEPTIBLE — CPSG-2875, S2008-AUS-129, S2008-M-49 S2008-M-55

6. TITLE **SCREENING OF SUGARCANE CLONES AGAINST RED STRIPE / TOP ROT *(XANTHOMONAS RUBRILINEANS (LEE) STAPP).***

OBJECTIVE — To screen out promising sugarcane clones against red stripe / top rot.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan,
Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Lines: 15
Layout: Augmented design
Plot size 3m × 2.4 m
Check clones: S2009-AUS-87, S2007-AUS-59 & CSSG-1239

METHODOLOGY — 45 clones of sugarcane were planted along with the check lines in the month of September-2014. Inoculation will be done during the month of July. Observations will be recorded on the basis of leaf stripes and top rot.

Rating scale for Red Stripe disease of sugarcane (%)

0 – 5	=	Resistant
5.1 – 15	=	Moderately Resistant
15.1 – 30	=	Moderately Susceptible
Above 30	=	Susceptible

PREVIOUS YEAR'S RESULTS — Out of 45 clones, 39 were found resistant and 02 moderately resistant.02 moderately Susceptible & 02 susceptible.

RESISTANT — S2006-US-658, S2008-AUS-133, S2008-AUS-129, S2008-FD-19,S2008-M-38, S2008-M-79, S2009-AUS-107.

MODERATELY RESISTANT — S2007-AUS-576, CSSG-1239

MODERATELY SUSCEPTIBLE — CSSG-212, S2008-AUS-134,

SUSCEPTIBLE — S2008-AUS-135, S2007-AUS-59

7. TITLE **SCREENING OF SUGARCANE CLONES AGAINST RUST *(PUCCINIA MELANOCEPHALA)***

OBJECTIVE — Studies are aimed to screen rust resistant lines from the local and exotic material of sugarcane.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan, Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Clones: 15
Layout: Augmented design
Plot size 3m × 2.4 m
Check clones: BF-162, S2008-AUS-281, S2006-SP-30

METHODOLOGY — 15 sugarcane clones were planted in the month of September, 2014 along-with a spreader variety BF-162 planted at the border and the centre of the experimental plot after every 8 rows. Inoculation will be occurred naturally by urediospores releasing from the infested leaves of the spreader variety BF-162. Artificial inoculation will also be made using whorl method by placing 0.5-1.0 ml spores suspension (@10 urediospores/ml) into the spindle leaf whorl during the month January/February. The reaction of sugarcane lines against rust will be determined by using 1-4 disease rating scale.

Rating scale for Rust disease

1 = Resistant
2 = Moderately Resistant
3 = Moderately Susceptible
4 = Susceptible

PREVIOUS YEAR'S RESULTS — All the clones were found resistant to the diseases.

RESISTANT LINES — S2006-US-658, S2006-US-832, S2008-AUS-134, S2008-AUS-133, S2003-AUS-129,S2008-FD-19, S2008-M-42, S2007-AUS-375, S2007-AUS-281, S2008-AUS-134 & S2008-AUS-135

Brief summary of previous year's results (expt. 1 to 7)

Reaction to diseases	No. of lines				
	Red rot	Whip smut	Pokkah boeng	Red stripe	Rust
Resistant (R)	149	24	36	39	45
Moderately Resistant (MR)	64	14	05	02	0
Moderately Susceptible (MS)	16	04	-	02	0
Susceptible (S)	6	03	04	02	0
Total:	255	45	45	45	45

RESISTANT CLONES

1.	S2008-AUS-129	8.	S2009-SA-57
2.	S2008-AUS-130	9.	S2009-SA-79
3.	S2008-AUS-133	10.	S2009-SA-111
4.	S2008-AUS-134	11.	S2009-SA-169
5.	S2008-AUS-138	12.	S2006-US-272
6.	S2008-AUS-190	13.	S2006-US-658
7.	S2008-FD-19	14.	S2008-m-34

8. TITLE **REACTION OF SUGARCANE PROMISING LINES TO DIFFERENT STRAINS / ISOLATES OF RED ROT.**

OBJECTIVE — To find out resistance in cane clones against prevailing strains/isolates of red rot.

RESEARCHERS: — Hafiz Muhammad Walayat Ali Khan, Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION — Continuous nature (2014-15)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Clones: 15
Layout: Augmented design
Plot size 3m × 4.8 m
Check clones: CO-1148, SPSG-394 & S2003-US-718

METHODOLOGY — 15 promising sugarcane clones were planted in the month of September, 2014 and inoculations of available strains of red rot will be made during July, August using Plug Technique. The inoculated canes will be harvested after two months of inoculation. The varietal reaction will be assessed on the basis of Srinivasan's Bhat's disease rating scale (0 – 9).

PREVIOUS YEAR'S RESULTS	Out of 13 promising clones of sugarcane, 3 clones were found to be resistant/moderately resistant, 2 showed moderately susceptible/susceptible and remaining had mixed reaction (R,MR,MS and S) against three isolates of red rot. Viz: cf-1148, cf-234, cf-718
RESISTANT/MODERATELY RESISTNAT LINE: (R,MR)	S2005-US-54, S2008-FD-19 S2006-US-658, S2008-AUS-134
MODERATELY SUSCEPTIBLE/ SUSCEPTIBLE LINES (MS,S)	S2008-M-42, S2008-AUS-138
MIXED REACTION (R, MR, MS & S)	S2008-AUS-133, S 2008-SP-93, S2008-AUS-135, S2007-AUS-384, S2008-M-38, S2006-US-832, S2008-AUS-190 & S2008-MAU-42

9. TITLE: **SCREENING OF SUGARCANE CLONES AGAINST DISEASES IN RATOON CROP.**

OBJECTIVE	To find out resistance in sugarcane clones grown as ratoon crop against major diseases (Red rot, whip smut, pokkah boeng, red stripe & rust).
RESEARCHERS:	Hafiz Muhammad Walayat Ali Khan, Dr. Muhammad Abdul Shakoor & Zulfiqar Ali
DURATION	2015-16
LOCATION	Sugarcane Research Institute, Faisalabad.
TREATMENTS	Lines 45 Layout: Augmented design Plot size 3m × 4.8 m Check varieties: 3
METHODOLOGY	The September planted crop of 45 clones of sugarcane will be kept as ratoon under natural condition of disease appearance. The assessment of varietal reaction against diseases will carried out accordingly as mentioned earlier.
PREVIOUS YEAR'S RESULTS	New experiment

10. TITLE: **MANAGEMENT OF WHIP SMUT DISEASE OF SUGARCANE THROUGH THE USE OF FUNGI TOXICANTS/CULTURAL PRACTICES.**

OBJECTIVE: To find out the effective control measures of the disease.

RESEARCHERS: Hafiz Muhammad Walayat Ali Khan,
Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION: 2014-15

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS: 9

i. Cordate 4% WP (Kasugamycin) @ 2.5 grams/litter water
ii. Wisdom 80% WDG (Fosetyl-Al) @ 2.5 grams/litter water
iii. Definite 10% WDG (Difenoconazole) @ 2.5 grams/litter water
iv. Defeater 20% WP (Flumorph) @ 2.5 grams/litter water
v. Electus Super 30% SC (Difenoconazole 8% + Azoxystrobin 22%) @ 2.5 grams/litter water
vi. Bloom 25% EC (Myclobutanil) @ 2.5 ml/litter water
vii. Flumax 60% EC (Fluazinam 40% + Metalaxyl-M 20%) @ 2.5 ml/litter water
viii. Cane setts (without fungicidal treatment)
ix. Check

Variety = HSF-240
Layout = RCBD
Plot size = 3m × 2.4 m

METHODOLOGY: The experiment was conducted in September planted crop and the setts of sugarcane variety HSF-240 were dipped in spore suspension of whip smut pathogen (*Ustilago scitaminea*) prepared @ 4 grams/liter for 30 minutes to produce the disease artificially. The inoculated setts were treated with fungicides as mentioned above. In treatment No. VIII (untreated with fungicide) scheduled roughing of whip smut infected plants will be made. The data will be recorded on the basis of diseased canes.

PREVIOUS YEAR'S RESULTS: New experiment.

11. TITLE **CHEMICAL / CULTURAL CONTROL OF WHIP SMUT DISEASE OF SUGARCANE IN RATOON CROP.**

OBJECTIVE To find out the effective control measures of the disease in standing / ratoon crop of sugarcane.

RESEARCHERS: Hafiz Muhammad Walayat Ali Khan,
Dr. Muhammad Abdul Shakoor & Zulfiqar Ali

DURATION 2014-15

LOCATION Sugarcane Research Institute, Faisalabad.

TREATMENTS 9

i. Cordate 4% WP (Kasugamycin) @ 2.5 grams/litter water
ii. Wisdom 80% WDG (Fosetyl-Al) @ 2.5 grams/litter water
iii. Definite 10% WDG (Difenoconazole) @ 2.5 grams/litter water
iv. Defeater 20% WP (Flumorph) @ 2.5 grams/litter water
v. Electus Super 30% SC (Difenoconazole 8% + Azoxystrobin 22%) @ 2.5 grams/litter water
vi. Bloom 25% EC (Myclobutanil) @ 2.5 ml/litter water
vii. Flumax 60% EC (Fluazinam 40% + Metalaxyl-M 20%) @ 2.5 ml/litter water
viii. Cane setts (without fungicidal treatment)
ix. Check

Variety	=	HSF-240
Layout	=	RCBD
Plot size	=	3m × 2.4 m

METHODOLOGY The experiment will be conducted in ratoon crop of HSF-240. Pre-emergence spray of whip smut inoculum will be made to produce the disease artificially. After completion of sprouting, the infected plants will be rogued out followed by the spray of mentioned fungicides except treatment No. VIII where no fungicide will be applied only rouging of infected plants will be made. In this way, three consecutive fungicidal sprays at an interval of one month will be carried out. The data will be recorded on this basis of diseased plants.

PREVIOUS YEAR'S RESULTS New experiment.

E. SUGARCANE ENTOMOLOGY

1. TITLE **SCREENING OF ADVANCED CLONES OF NUVYT FOR RESISTANCE AGAINST SUGARCANE BORERS.**

OBJECTIVE — To select most promising clones having resistance against sugarcane borers.

RESEARCHERS: — Muhammad Munir, Hafiz Walayat Ali Khan, Dr. Javed Iqbal & Zulfiqar Ali

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

Layout	=	RCBD
Plot size	=	5m × 4.80m
Replications	=	4
Seed rate	=	50,000 TBS ha^{-1}
Fertilizer	=	168-112-112 NPK kg ha^{-1}
Date of planting	=	September – 2014

Set-I (6)
S2006-SP-93, HOSG-31, CSSG-32, Thatta-910, YTTh-236, CPF-247 (Check).

Set-II (6)
S2007-AUS-384, NARC-1, NARC-2, CSSG-33, YTTh-53, CPF-246 (check).

METHODOLOGY — The new varieties / advance clones planted at Sugarcane Research Institute, Faisalabad in NUVYT will be screened for checking their comparative resistance against sugarcane borers viz; top, stem and root borers. For this purpose dead heart % will be recorded twicely during the months of March & April with one month interval, by counting the total number of tillers along with infested tillers from each central 2 rows of each plot. At harvest time, inter-node damage will be recorded by collecting the samples of 10 randomly selected canes of each variety / advance line from 4 replications. The canes will be splitted longitudinally and closely observed for borer damage. Inter-node damage will be recorded by counting the

total number of internodes along with attacked internodes for each borer, separately.
The assessment of reaction for resistance of different sugarcane borers will be done on the grading given by Mann Singh 2001.

Reaction	**Inter-nodal damage % by**		
	Top borer	Stem borer	Root borer
Resistant (R)	0-10	0-10	0-10
Moderately Resistant (MR)	10.10-20	10.10-20	10.10-20
Susceptible (S)	20.10-40	20.10-40	20.10-40
Highly Susceptible (HS)	40.10 and above	40.10 and above	40.10 and above

REVIOUS YEAR'S RESULTS Set-I

Sr. No	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1.	S2007-AUS-384	3.49	2.89	R	3.64	R	3.64	R
2.	NARC-1	2.84	3.24	R	6.17	R	3.48	R
3.	CSSG-33	4.15	2.65	R	5.00	R	6.62	R
4.	YTTB-53	2.69	2.93	R	5.19	R	5.50	R
5.	NARC-II	2.11	3.23	R	6.27	R	5.17	R
6.	CPF-246 (check)	2.68	3.45	R	2.99	R	3.36	R

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer
R = Resistant MR = Moderately resistant

Set-II

Sr. No	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1.	SPSG-24	3.56	1.35	R	5.72	R	5.42	R
2.	SPSG-27	3.59	3.06	R	4.12	R	2.78	R
3.	SPSG-29	4.76	1.95	R	5.21	R	5.93	R
4.	HoSG-31	4.08	3.08	R	5.05	R	6.74	R
5.	CSSG-32	3.31	3.20	R	3.08	R	6.39	R
6.	YTTh-55	3.48	2.54	R	5.25	R	5.04	R
7.	BPTh-804	4.11	3.31	R	4.86	R	5.93	R
8.	CPSG-33	2.40	3.10	R	8.22	R	6.05	R
9.	CPF-247 (check)	1.69	0.81	R	1.43	R	2.55	R

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer
R = Resistant MR = Moderately resistant

2. TITLE **SCREENING OF ADVANCE CLONES OF FINAL VARIETAL TRAIL FOR RESISTANCE AGAINST SUGARCANE BORERS.**

OBJECTIVE: To select promising clones having resistance against sugarcane borers.

RESEARCHERS: Muhammad Munir, Hafiz Walayat Ali Khan & Zulfiqar Ali

DURATION: Continuous nature (2015-16)

LOCATION: Sugarcane Research Institute, Faisalabad.

TREATMENTS:

Final varietal trial	18varieties/clones(Set-I & Set-II)
Layout	RCBD
Replications	3
Plot size	4m × 9.6 m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112NPK Kg ha^{-1}
Time of planting	Spring, 2015

METHODOLOGY: The new varieties / advance clones planted at Sugarcane Research Institute, Faisalabad in final varietal trial will be screened for checking their comparative resistance against sugarcane borers viz; top, stem and root borers. For this purpose dead heart % will be recorded twicely during the months of April & May with one month interval, by counting the total number of tillers along with infested tillers from each central 2 rows of each plot. At harvest time, inter-node damage will be recorded by collecting the samples of 10 randomly selected canes of each variety / advance line from 3 replications. The canes will be splitted longitudinally and closely observed for borer damage. Internode damage will be recorded by counting the total number of internodes along with attacked internodes for each borer, separately.

PREVIOUS YEAR'S RESULTS Final varietal trial **(Set-1).**

Sr. No	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1.	S2006-SP-93	2.76	0.00	R	3.44	R	1.60	R
2.	S2006-US-272	3.51	0.00	R	3.66	R	1.81	R
3.	S2006-US-658	0.00	0.00	R	2.99	R	1.84	R
4.	S2008-FD-19	1.19	1.04	R	3.69	R	1.38	R
5.	S2008-M-34	0.97	1.79	R	5.21	R	1.36	R
6.	S2008-M-38	0.00	1.85	R	3.35	R	2.38	R
7.	S2008-M-42	1.85	1.02	R	3.18	R	4.34	R
8.	S2008-AUS-107	0.00	0.00	R	2.43	R	1.66	R
9.	HSF-240	1.31	0.00	R	2.45	R	1.50	R
10.	CPF-247	0.00	0.00	R	1.96	R	1.30	R

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer R = Resistant

Set-II

Sr. No	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1	S2008-AUS-129	1.44	1.44	R	1.12	R	2.29	R
2	S2008-AUS-130	0.80	0.80	R	0.00	R	4.05	R
3	S2008-AUS-133	1.05	1.05	R	0.00	R	3.77	R
4	S2008-AUS-134	1.18	1.18	R	1.33	MR	1.18	R
5	S2008-AUS-138	0.97	0.97	R	0.00	R	2.61	R
6	S2008-AUS-190	0.00	0.00	R	0.00	R	4.43	R
7	S2009-SA-57	1.19	1.19	R	1.29	R	2.80	R
8	S2009-SA-79	1.47	1.47	R	0.85	R	3.18	R
9	S2009-SA-111	0.67	1.26	R	5.94	R	1.85	R
10	S2009-SA-169	1.02	0.00	R	3.43	R	2.08	R
11	CPF-247	0.68	0.00	R	3.28	R	0.00	R
12	HSF-240	0.00	0.00	R	3.22	R	2.10	R

T.B. = Top Borer, S.B.= Stem Borer, R.B.= Root Borer
R = Resistant MR = Moderately resistant MS = Moderately Susceptible

3. TITLE **SCREENING OF ADVANCE CLONES OF SEMI-FINAL TRIAL FOR RESISTANCE AGAINST SUGARCANE BORERS.**

OBJECTIVE To select promising clones having resistance against sugarcane borers.

RESEARCHERS: Muhammad Munir, Hafiz Walayat Ali Khan & Zulfiqar Ali

DURATION Continuous nature (2015-16)

LOCATION — Sugarcane Research Institute, Faisalabad

TREATMENTS

Expected No. of clones	10
Layout	RCBD
Replications	3
Plot size	4m × 9.60 m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112 NPK Kg ha^{-1}
Check varieties	HSF 240 & CPF 247
Time of planting	Spring- 2015

METHODOLOGY — The new varieties / advance clones planted at Sugarcane Research Institute, Faisalabad in semi-final varietal trial will be screened for checking their comparative resistance against sugarcane borers viz; top, stem and root borers. For this purpose dead heart % will be recorded twicely during the months of April & May with one month interval, by counting the total number of tillers along with infested tillers from each central 2 rows of each plot. At harvest time, inter-node damage will be recorded by collecting the samples of 10 randomly selected canes of each variety / advance line from 3 replications. The canes will be splitted longitudinally and closely observed for borer damage. Internode damage will be recorded by counting the total number of internodes along with attacked internodes for each borer, separately.

PREVIOUS YEAR'S RESULTS — Semi-final varietal trial

Sr. No	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1.	S2008-FD-17	1.00	0.93	R	3.39	R	2.00	R
2.	S2008-M-55	1.67	1.39	R	3.96	R	2.48	R
3.	S2008-M-148	0.00	1.35	R	1.42	R	1.68	R
4.	S2009-SA-8	1.84	0.00	R	2.79	R	1.83	R
5.	S2009-SA-48	0.91	0.00	R	1.28	R	2.11	R
6.	S2009-SA-67	0.00	0.00	R	2.00	R	1.73	R
7.	S2009-SA-171	0.00	0.00	R	2.49	R	2.00	R
8.	SL-96-128	1.79	1.99	R	2.75	R	1.93	R
9.	SL-96-175	0.00	1.34	R	2.34	R	2.09	R
10.	SL-97-142	0.75	1.04	R	1.92	R	2.08	R
11.	HSF 240	0.67	0.00	R	0.95	R	1.07	R
12.	CPF 247	1.43	0.00	R	1.16	R	1.08	R

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer &
R = Reaction R = Resistant

4. TITLE **SCREENING OF ADVANCE CLONES OF FINAL TRIAL FOR RESISTANCE AGAINST SUGARCANE BORERS UNDER NATURAL CONDITIONS.**

OBJECTIVE To select promising clones having resistance against sugarcane borers.

RESEARCHERS: Muhammad Munir, Hafiz Walayat Ali Khan & Zulfiqar Ali

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Institute, Faisalabad.

TREATMENTS

Design	RCBD
Replications	3
Plot size	4.8m × 5 m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112 NPK Kg ha^{-1}
Time of planting	Spring- 2015
Varieties	18

METHODOLOGY The new varieties / advance clones of final trial will be planted at Sugarcane Research Institute, Faisalabad and screened for checking their comparative resistance against sugarcane borers viz; top, stem and root borers. All recommended inputs will be applied uniformly throughout the season except insecticide application. For this purpose dead heart % will be recorded twicely during the months of April & May with one month interval, by counting the total number of tillers along with infested tillers from each central 2 rows of each plot. At harvest time, inter-node damage will be recorded by collecting the samples of 10 randomly selected canes of each variety / advance line from 3 replications. The canes will be splitted longitudinally and closely observed for borer damage. Internode damage will be recorded by counting the total number of internodes along with attacked internodes for each borer separately.

PREVIOUS YEAR'S RESULTS

Sr. No.	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1.	S2006-SP-93	4.68	1.63	R	10.84	MR	2.57	R
2.	S2006-US-272	2.41	1.02	R	7.35	R	3.96	R
3.	S2006-US-658	3.81	1.17	R	5.63	R	3.10	R
4.	S2008-FD-19	4.41	2.29	R	6.19	R	2.87	R
5.	S2008-M-34	5.92	2.20	R	7.96	R	4.28	R
6.	S2008-M-38	7.17	3.90	R	6.32	R	4.94	R
7.	S2008-M-42	2.03	3.36	R	9.67	R	3.44	R
8.	S2008-AUS-107	3.12	2.97	R	4.73	R	5.47	R
9.	S2008-AUS-129	4.01	4.03	R	7.93	R	6.89	R
10.	S2008-AUS-130	2.10	3.09	R	9.45	R	4.41	R
11.	S2008-AUS-133	4.89	4.01	R	7.01	R	4.47	R
12.	S2008-AUS-134	4.05	3.45	R	6.32	R	5.09	R
13.	S2008-AUS-138	2.80	4.85	R	9.25	R	3.45	R
14.	S2008-AUS-190	2.51	1.77	R	7.23	R	3.42	R
15.	S2009-SA-57	5.35	2.29	R	6.99	R	3.64	R
16.	S2009-SA-79	3.35	2.21	R	8.27	R	5.18	R
17.	S2009-SA-111	3.54	4.14	R	13.37	MR	4.92	R
18.	S2009-SA-169	3.99	3.01	R	8.41	R	4.00	R
19.	CPF-247	4.07	3.86	R	4.02	R	3.42	R
20.	HSF-240	4.45	2.60	R	4.09	R	3.75	R

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer & R = Resistant

5. TITLE **SCREENING OF ADVANCE CLONES OF SEMI-FINAL VARIETAL TRIAL FOR RESISTANCE AGAINST SUGARCANE BORERS UNDER NATURAL CONDITIONS.**

OBJECTIVE To select promising clones having resistance against sugarcane borers.

RESEARCHERS: Muhammad Munir, Hafiz Walayat Ali Khan & Zulfiqar Ali

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Institute, Faisalabad.

TREATMENTS

Design	RCBD
Replications	3
Plot size	4.8m × 5 m
Seed rate	50,000 TBS ha^{-1}

Fertilizer	168-112-112 NPK Kg ha^{-1}
Time of planting	Spring- 2015
Varieties	18

METHODOLOGY

The new varieties / advance clones of final trial will be planted at Sugarcane Research Institute, Faisalabad and screened for checking their comparative resistance against sugarcane borers viz; top, stem and root borers. All recommended inputs will be applied uniformly throughout the season except insecticide application. For this purpose dead heart % will be recorded twicely during the months of April & May with one month interval, by counting the total number of tillers along with infested tillers from each central 2 rows of each plot. At harvest time, inter-node damage will be recorded by collecting the samples of 10 randomly selected canes of each variety / advance line from 3 replications. The canes will be splitted longitudinally and closely observed for borer damage. Internode damage will be recorded by counting the total number of internodes along with attacked internodes for each borer separately.

PREVIOUS YEAR'S RESULTS

Sr. No.	Advance Clones	Tiller infestation %	Inter-nodal damage % by					
			T.B.	Reaction	S.B.	Reaction	R.B.	Reaction
1.	S2008-FD-17	5.27	3.65	R	8.67	R	8.94	R
2.	S2008-M-55	1.52	2.41	R	8.69	R	6.47	R
3.	S2008-SA-48	4.88	2.70	R	4.26	R	457	R
4.	S2008-SA-8	6.56	2.34	R	9.54	R	4.05	R
5.	S2008-M-148	2.39	2.67	R	4.89	R	6.42	R
6.	S2008-SA-67	2.20	2.39	R	7.26	R	4.59	R
7.	S2008-SA-171	4.89	5.88	R	4.72	R	3.97	R
8.	SL-96-128	1.53	4.15	R	5.06	R	2.54	R
9.	SL-96-175	0.00	2.66	R	8.72	R	5.11	R
10.	SL-97-142	1.85	2.14	R	7.35	R	6.83	R
11.	CPF-247	4.05	1.05	R	3.37	R	3.24	R
12.	HSF-240	2.35	1.88	R	2.44	R	2.64	R

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer & R = Resistant

6. TITLE **EFFICACY OF DIFFERENT GRANULAR INSECTICIDES AGAINST SUGARCANE BORERS.**

OBJECTIVE

To find out effective insecticides for the control of borers.

RESEARCHERS: Muhammad Munir, Hafiz Walayat Ali Khan & Zulfiqar Ali

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Institute, Faisalabad.

TREATMENTS

Treatments	6
Plot size	5m × 9.5 m
Seed rate	50,000 TBS ha^{-1}
Fertilizer	168-112-112 NPK Kg ha^{-1}
Time of planting	Spring- 2015
Variety	CPF-248
Design	R.C.B.D

Insecticide application schedule. (kg ha^{-1})

Sr.#.	Insecticide	Ist application at planting	2nd application 45DAP	3rd application 90DAP	Total
1	Refree 0.3 G	20	20	40	80
2	Furadan 3 G	20	20	40	80
3	Refree Super 0.35 G	20	20	40	80
4	Vertako 0.6 G	10	10	10	30
5	Ferterra 0.4 G	10	10	10	30
6	Control	-	-	-	-

METHODOLOGY

The above mentioned insecticides will be applied according to the schedule mentioned above. The new variety CPF-248 will be planted at Sugarcane Research Institute, Faisalabad. Dead heart % will be recorded twicely during the months of April & May with one month interval, by counting the total number of tillers along with infested tillers from each central 2 rows of each plot. At harvest time, internode damage will be recorded by collecting the samples of 10 randomly selected canes of each variety / advance line from 3 replications. The canes will be splitted longitudinally and closely observed for borer damage. Inter node damage will be recorded by counting the total number of internodes along with attacked internodes for each borer, separately. At the end yield t ha^{-1} will also be recorded.

PREVIOUS YEAR'S RESULTS

Sr.#.	Insecticides	D.H. %age	Internode damage %age				Yield t ha^{-1}
			Top borer	Stem borer	Root borer	Cumulative damage	
	Refree Super 0.35 G	5.34	1.14	8.49	2.36	11.99	120.28
	Furadan 3 G	5.60	0.71	2.13	4.29	7.13	109.44
	Refree 0.3 G	4.53	1.53	8.31	2.09	11.93	128.12
	Control	12.70	2.77	15.59	5.64	24.00	82.64

7. TITLE **EFFECTIVE CONTROL OF RATS IN SUGARCANE FIELD.**

OBJECTIVE — To find out a suitable rodenticide to minimize losses by rates.

RESEARCHERS: — Muhammad Munir, Hafiz Walayat Ali Khan & Zulfiqar Ali

DURATION — Continuous nature (2014-15)

LOCATION — Sugarcane Research Institute, Faisalabad.

TREATMENTS

T1: Hit –Rat 80% Powder(Zinc Phosphate)@25 g +25 ml edible oil mixed with 950 g crushed wheat.

T2: Ractophos 80 % Powder(Zinc Phosphide)@25 g +25 ml edible oil mixed with 950 g crushed wheat.

T3: Rat killer 1 liter $acre^{-1}$

METHODOLOGY — Pre-treatment data will be recorded on per acre basis by observing all alive burrows. The alive burrows will be treated by placing 10 g of each bait material. After one week these treated burrows will be filled with soil and rodent activity will be observed.

PREVIOUS YEAR'S RESULTS — The experiment is being conducted. The result will be submitted later on.

8. TITLE: **TESTING OF TRANSGENIC SUGARCANE**

FOR BORER RESISTANCE (PARB Project 193)

OBJECTIVE: To check the performance of a transgenic sugarcane clone (CPF-246) against borer resistance via PARB Project 193.

RESEARCHERS: Dr. Muhammad Afzal, Muhammad Munir, Muhammad Yasir Riaz and Zulfiqar Ali

COLLABORATION Center for Excellence in Molecular Biology (CEMB), Lahore

PROJECT DURATION: 2013-2015

TREATMENTS:

Variety/Clone:	CPF-246 (Transgenic material)
Location:	SRI, Faisalabad
Layout:	Non-replicated
Seed rate:	50,000 TBS ha^{-1}
Fertilizer:	168-112-112 NPK kg ha^{-1}
Time of planting:	Spring - 2015

METHODOLOGY: 22 entries of transgenic CPF-246, screened against borers will be planted at research area of Sugarcane Research Institute, Faisalabad during Spring – 2015 in non replicated design. All standard agronomic practices will be followed except insecticide application. The data regarding dead-heart % will be recorded during April – May and internode damage will be recorded at harvest time.

PREVIOUS YEAR'S RESULTS <u>Borer infestation %age on transgenic CPF-246</u>

Sr.No.	Entry no.	Dead heart %age	Internode damage %age			
			T.B.	S.B.	R.B.	Cumulative damage
1.	2L/3	7.05	0.00	0.00	2.23	2.23
2.	2L/6	7.60	0.00	0.00	6.18	6.18
3.	2L/8	14.29	4.17	0.00	2.09	6.25
4.	3L/3	8.07	0.00	0.00	2.09	2.09
5.	3L/4	7.41	0.00	0.00	5.69	5.69
6.	4L/2	5.27	0.00	0.00	0.00	0.00
7.	4L/7	5.27	0.00	0.00	2.44	2.44
8.	4L/8	6.25	0.00	0.00	4.45	4.45
9.	5L/1	9.26	4.82	0.00	0.00	4.82

10.	5L/2	8.83	2.95	0.00	8.83	11.77
11.	5L/5	11.12	0.00	0.00	0.00	0.00
12.	6L/2	14.29	0.00	0.00	4.76	4.76
13.	6L/3	6.82	5.17	0.00	0..00	5.17
14.	6L/5	7.15	0.00	0.00	0.00	0.00
15.	7L/2	2.04	4.11	0.00	2.74	6.85
16.	7L/7	7.15	2.63	0.00	3.95	6.58
17.	8L/ 1/3	5.27	2.86	0.00	7.14	10.00
18.	8L/4	7.70	0.00	0.00	0.00	0.00
19.	8L/7	3.23	0.00	0.00	6.67	6.67
20.	9L/6	13.16	0.00	0.00	5.00	5.00
21.	Unknown	12.00	0.00	0.00	6.41	6.41
22.	CPF-246 untreated	7.22	2.71	11.98	4.88	12.55
23.	CPF-246 treated	2.81	2.03	3.97	1.78	7.78

T.B. = Top Borer, S.B.= Stem Borer, R.B. = Root Borer & R = Resistant

9. TITLE: **STUDIES ON THE POPULATION DYNAMICS OF SUGARCANE INSECT PESTS IN DIFFERENT LOCATIONS OF PUNJAB.**

OBJECTIVE: To determine the population fluctuation of major insect pests of sugarcane and their intensity throughout the crop season.

RESEARCHERS:
- Muhammad Munir, Hafiz Muhammad Walayat Ali Khan & Zulfiqar Ali (SRI, Faisalabad)
- Muhammad Latif & Ali Aziz (ERI, Faisalabad)

DURATION: 2015-2018

LOCATION: Faisalabad, Chiniot, Jhang, Bahawalpur at Farmer's field.

METHODOLOGY: A block of five acres of sugarcane of the same variety will be selected in each District. Data regarding borers, pyrilla and whitefly will be recorded at fortnightly interval starting from 2nd week of April till crop harvest. The data so obtained will also be correlated with weather factors.

PREVIOUS YEARS RESULTS: New experiment.

10. TITLE: **EFFECT OF GRANULAR INSECTICIDE**

APPLICATION ON WHITEFLY POPULATION USED FOR BORER CONTROL ON SUGARCANE HSF-240.

OBJECTIVE: To determine the effect of different granular insecticides on whitefly population / incidence on sugarcane.

RESEARCHERS: - Muhammad Munir, Hafiz Muhammad Walayat Ali Khan & Zulfiqar Ali (SRI, Faisalabad)

- Muhammad Latif & Abdul Ghaffar (ERI, Faisalabad)

DURATION: 2015-2018

LOCATION: Chiniot

TREATMENTS:

Sr. #.	Insecticide		Ist application at sowing	2nd application 45DAP	3rd application 90DAP	Total kg ha^{-1}
	Trade Name	Generic name				
1.	Furadan 3 G	Carbofuran	20	20	40	80
2.	Refree 0.3 G	Fipronil	20	20	40	80
3.	Vertako 0.6 G	Thiomethoksam 0.4 G Chlorantraneliprol (CTPR) 0.2 G	10	10	10	30
4.	Fusion 4 G	Fipronil	15	15	30	60
5.	Control		-	-	-	-

METHODOLOGY: Trial will be conducted following RCBD at the farmer's field previously heavily infested with whitefly in Chiniot area. The treatments will be applied at recommended doses and time of application for borer control. Data regarding borer infestation and white fly will be recorded after 15 and 30 days of each application and then after 10 days interval till crop harvest.

PREVIOUS YEARS RESULTS: New experiment.

11. TITLE: CHEMICAL CONTROL OF WHITE FLY ON SUGARCANE.

OBJECTIVE: To find out comparatively more effective insecticide for the control of whitefly for farmer recommendations.

RESEARCHERS:
- Muhammad Munir, Hafiz Muhammad Walayat Ali Khan & Zulfiqar Ali (SRI, Faisalabad)
- Muhammad Latif & Ali Aziz (ERI, Faisalabad)

DURATION: 2015-2017

LOCATION: Anywhere heavily infested field in surroundings of Faisalabad.

TREATMENTS:

Sr.#.	Insecticides		Dose ml/acre
	Trade Name	Generic Name	
1.	Confidor 200SL	Imidacloprid	250 ml
2.	Dimethoate	Dimethoate	400 ml
3.	Advantage 25EC	Carbosulfan	500 ml
4.	Refree 5SC	Fipronil	480 ml
5.	Talstar 10EC	Bifenthrin	250 ml
6	Control	--	--

METHODOLOGY: Heavy infested field with whitefly will be selected for the trial. The insecticide will be applied with power knapsack sprayer. Data regarding whitefly population will be recorded before and then after 72 hours, 7 days, 10 days and 15 days of spray. Percentage reduction will be calculated on the basis of pretreatment. Data will be statistically analyzed.

PREVIOUS YEARS RESULTS: New experiment.

F. ANNUAL RESEARCH PROGRAMME OF SUGARCANE RESEARCH STATION, KHANPUR

1 TITLE **PRELIMINARY VARIETAL TRIAL ON SUGARCANE**

OBJECTIVES — To evaluate the new sugarcane clones/varieties for further selection in southern Punjab.

RESEARCH WORKERS — Muhammad Aslam, Muhammad Kashif Hanif and Dr. Naeem Ahmad

DURATION — Continuous nature (2015-16)

LOCATION — Sugarcane Research Station, Khanpur

TREATMENTS — Varieties/clones (10) i.e., S2009SA.8, S2009SA.41, S2009SA.57, S2009SA.67, S2009SA.79, S2009SA.111, S2009SA.169, S2009SA.171, SL.96-128 and CPF.248 (check)

Layout	RCBD
Replications	3
Plot size	3.6m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	February 2015

METHODOLGY — Trial will consist of clones/varieties received from Sugarcane Research Institute, Faisalabad. The experiment will be sown on a well prepared seed bed in 1.20 m apart trenches (15-20 cm deep) under dry conditions. The varieties will be allowed to grow under uniform inputs and agronomic practices. The selection criteria is based on growth habit, tillering, brix% and disease reaction. The data on cane germination, tillering, cane stand, cane yield and quality will be recorded.

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S.No	Variety/clones	Germi-nation%	Tillers/ plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2008FD.17	43.05ab	2.17bcd	104.17ef	74.25g
2	S2008FD.19	45.07ab	2.70abcd	131.02b	110.00abc
3	S2008M.34	44.19ab	1.63d	77.22h	81.57efg
4	S2008M.38	41.81ab	2.08cd	99.45g	79.17fg
5	S2008M.42	44.51ab	3.23ab	128.70b	117.22a
6	S2008M.55	46.52a	2.33abcd	101.95fg	86.95ef
7	S2008M.56	33.92b	2.94abc	103.43ef	91.76de
8	S2008M.79	47.98a	3.02abc	123.24c	101.95bcd
9	S2008M.80	42.01ab	3.31a	108.61d	99.91cd
10	S2008M.107	44.34ab	2.44abcd	140.19a	112.59ab
11	CPF.248	45.09ab	2.04cd	105.93de	115.37a
LSD 0.05		11.96	1.15	03.31	12.29

2. TITLE **SEMI FINAL VARIETAL TRIAL ON SUGARCANE**

OBJECTIVES To evaluate the various sugarcane clones/varieties for high cane and sugar yields in southern Punjab conditions.

RESEARCH WORKERS Muhammad Kashif Hanif, Muhammad Aslam and Dr. Naeem Ahmad

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Station, Khanpur

TREATMENTS Varieties/clones 11 i.e., S2008FD.17, S2008FD.19, S2008M.34, S2008M.38, S2008M.42, S2008M.55, S2008M.56, S2008M.80, S2008M.107,S2005US.54 ,CPF.246 and CPF.248

Layout	RCBD
Replications	3
Plot size	3.6m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	February 2015

METHODOLGY Experiment will consist of clones/varieties promoted from preliminary varietal trial.The data on germination,tillering,cane count,cane yield,sugar yield,lodging,frost,insectpest and disease reaction will be recorded. The selection will be done on the basis of quantity & quality performance of the clones/varieties.

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S.No	Variety/clones	Germi-nation %	Tillers/ plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2005US.54	46.46abcd	2.28bc	106.20d	99.81bcd
2	S2006SP.30	51.88ab	2.32abc	99.63e	106.94abc
3	S2006US.321	47.36abc	1.22e	96.39f	110.65a
4	S2008Aus.129	43.89abcd	1.29de	81.57h	97.41cd
5	S2008Aus.130	48.33abc	2.04bc	124.91a	111.11a
6	S2008Aus.133	38.61d	1.96bc	90.28g	103.80abc
7	S2008Aus.134	41.80cd	2.38ab	112.32c	107.50ab
8	S2008Aus.172	26.32e	2.86a	93.61f	76.70f
9	S2008Aus.195	52.36a	1.82cd	100.28e	87.59e
10	CPF.247	48.86abc	2.06bc	117.13b	91.30de
LSD 0.05		8.05	0.56	03.16	9.68

3 TITLE **FINAL VARIETAL TRIAL ON SUGARCANE**

OBJECTIVES To evaluate the promising sugarcane clones/varieties for high cane and sugar yields in southern Punjab.

RESEARCH WORKERS Muhammad Aslam, Muhammad Kashif Hanif and Dr. Naeem Ahmad

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Station, Khanpur

TREATMENTS Varieties/clones 10 i.e., S2006Sp.93, S2006US.272, S2006US.658, S2006SP.30, S2006US.321,S2008Aus.130, S200Aus.133, S2008Aus.134, S2008Aus.138 and SPF.234(check)

Layout	RCBD
Replications	4(one for periodic juice analysis)
Plot size	3.6m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	February 2015

METHODOLGY It is final stage of selection. The experiment will consist of varieties promoted from semi final varietal trial. The data on germination, tillering, cane count, cane yield will be recorded. Other characteristics like lodging tendency, frost effect, insect pest and disease reaction will also be taken into consideration. Periodic juice analysis data will be recorded month wise from mid October to mid February for quality performance. The selection will be made on the basis of quantity & quality performance of the clones/varieties.

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S.No	Variety/clones	Germi-nation %	Tillers/ plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2006SP.93	60.83a	2.22b	115.83b	119.63ab
2	S2006US.272	63.47a	2.31b	95.28ef	111.68b
3	S2006US.469	40.49b	3.33a	123.33a	99.26c
4	S2006US.658	54.23a	2.42b	101.30cd	121.84a
5	S2008Aus.135	41.60b	1.11d	84.35g	82.40d
6	S2008Aus.138	63.33a	1.76c	99.54de	123.05a
7	S2008Aus.190	51.87ab	1.52c	95.19f	89.54d
8	SPF.234	55.35a	2.34b	104.54c	102.50c
LSD 0.05		12.61	0.31	4.32	8.91

4 TITLE AUTUMN PLANTED VARIETAL TRIAL SET-I

OBJECTIVES To study the performance of various sugarcane clones for high cane and sugar yields under extended growth period in southern Punjab.

RESEARCH WORKERS Muhammad Kashif Hanif, Muhammad Aslam and Dr. Naeem Ahmad

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Station, Khanpur

TREATMENTS Varieties/clones 12 i.e., S2008M.34, S2008M.38, S2008M.42, S2008M.55, S2008M.56, S2008M.69, S2008M.76, S2008M.79, S2008M.80, S2008M.107, S2008Aus.130 and SPF.234 (Check)

Layout	RCBD
Replications	3
Plot size	3.6m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	September, 2014

METHODOLGY The experiment was sown on a well prepared seed bed in 1.20 m apart trenches (15-20 cm deep) under dry conditions. The varieties will be allowed to grow at uniform inputs level and recommended agronomic practices. The data on cane germination, tillering, cane stand, yield and quality will be recorded during the course of study

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S.No	Variety/clones	Germi-nation %	Tillers/ plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2003US.127	35.37b	1.61e	125.09ab	110.37d
2	S2003US.633	48.89ab	3.73a	129.82a	104.63e
3	S2003US.704	36.97ab	3.63ab	122.50ab	121.58ab
4	S2003US.718	48.58ab	3.60ab	117.41bc	117.41bc
5	S2003US.778	25.23c	3.14abc	119.08abc	103.24ef
6	S2006SP.93	51.67a	3.28ab	124.08ab	114.54cd
7	S2006US.272	47.53ab	2.78bcd	116.67bc	124.72a
8	S2007Aus.375	48.77ab	2.27cde	94.07e	87.69g
9	S2008M.42	49.94ab	3.53ab	110.09cd	99.72f
10	S2008Aus.129	36.97ab	1.17de	69.35f	81.39h
11	S2008Aus.195	39.51ab	2.01de	94.35e	79.45h
12	CPF.247	44.23ab	3.26ab	103.61de	90.65g
	LSD.	16.12	0.92	11.10	04.75

5 TITLE AUTUMN PLANTED VARIETAL TRIAL SET-II

OBJECTIVES To study the performance of various sugarcane clones for high cane and sugar yields under extended growth period in southern Punjab.

RESEARCH WORKERS Muhammad Aslam, Muhammad Kashif Hanif and Dr. Naeem Ahmad

DURATION Continuous nature (2015-16)

LOCATION Sugarcane Research Station, Khanpur

TREATMENTS Varieties/clones 8 i.e., S2008Aus.129, S2008Aus.133, S2008Aus.134, S2008Aus.138, S2008Aus.190, S2008Fsd.17,

S2008FD.19 and SPF.234(Check)

Layout	RCBD
Replications	3
Plot size	3.6 m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	September, 2014

METHODOLGY

The experiment was sown on a well prepared seed bed in 1.20 m apart trenches (15-20 cm deep) under dry conditions. The varieties will be allowed to grow at uniform inputs level and recommended agronomic practices. The data on cane germination, tillering, cane stand, yield and quality will be recorded during the course of study

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S. No	Variety/clones	Germi-nation %	Tillers/ plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2006US.658	52.95a	2.68bc	115.93abcd	119.45a
2	S2007SP.576	40.36a	3.05abc	127.41a	89.63f
3	S2008Aus.133	43.20a	3.73a	98.98fg	107.78b
4	S2008Aus.134	43.15a	3.49ab	104.63def	109.72b
5	S2008Aus.135	47.99a	1.47d	83.43h	91.76ef
6	S2008Aus.138	49.32a	2.47c	100.37ef	111.39b
7	S2008Aus.172	23.22b	2.37cd	110.74cde	93.61de
8	S2008Aus.184	49.58a	2.58bc	120.00abc	90.74ef
9	S2008Aus.190	54.75a	1.33d	88.80gh	88.89f
10	S2008FD.17	47.33a	2.89abc	114.35bcd	97.41c
11	S2008FD.19	49.07a	3.79a	125.37ab	108.61b
12	CPF.247	55.19a	3.19abc	111.57cde	96.76cd
	LSD	15.49	0.94	11.54	03.63

6 TITLE — AUTUMN PLANTED VARIETAL TRIAL SET-III

OBJECTIVES

To study the performance of various sugarcane clones for high cane and sugar yields under extended growth period in southern Punjab.

RESEARCH WORKERS

Muhammad Aslam, Muhammad Kashif Hanif and Dr. Naeem Ahmad

DURATION

Continuous nature (2015-16)

LOCATION

Sugarcane Research Station, Khanpur

TREATMENTS

Varieties/clones 10 i.e., S2009SA.8, S2009SA.41, S2009SA.57, S2009SA.67, S2009SA.79, S2009SA.111, S2009SA.169, S2009SA.171.SL.96-128 and SPF.234(Check)

Layout	RCBD
Replications	3

Plot size	3.6m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	September, 2014

METHODOLGY

The experiment was sown on a well prepared seed bed in 1.20 m apart trenches (15-20 cm deep) under dry conditions. The varieties will be allowed to grow at uniform inputs level and recommended agronomic practices. The data on cane germination, tillering, cane stand, yield and quality will be recorded during the course of study

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S. No	Variety/clones	Germi-nation %	Tillers/ Plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2008M.34	50.49abc	2.58de	89.72fg	101.39c
2	S2008M.38	44.16bc	3.05abcd	119.72abc	109.63b
3	S2008M.55	58.09a	3.39abc	81.76g	89.54e
4	S2008M.56	61.11a	2.63cde	91.39efg	81.30f
5	S2008M.69	43.15c	2.65cde	102.13de	91.85e
6	S2008M.76	44.63bc	3.62ab	110.74cd	97.41d
7	S2008M.79	55.85ab	1.93e	100.93def	84.35f
8	S2008M.80	62.31a	3.42abc	117.50bc	83.70f
9	S2008M.107	59.32a	3.62ab	131.76a	100.74cd
10	S2008Aus.178	52.28abc	3.83a	128.89ab	90.46e
11	S2008Aus.130	55.96ab	2.73cd	109.26cd	126.30a
12	CPF.247	55.60ab	2.87bcd	116.48c	107.78b
	LSD	12.38	0.79	12.34	03.54

7 TITLE — RATOONING POTENTIAL OF PROMISING SUGARCANE CLONES/VARIETIES

OBJECTIVES

To evaluate the ratooning ability of various sugarcane clones/varieties.

RESEARCH WORKERS

Muhammad Aslam, Muhammad Kashif Hanif and Dr. Naeem Ahmad

DURATION

2015-16

LOCATION

Sugarcane Research Station, Khanpur

TREATMENTS

Varieties/clones 8 i.e., S2006SP.93, S2006US.272, S2006US.469, S2006US.658, S2008Aus.135, S2008Aus.138, S2008Aus.190 and SPF.234(check).

Layout	RCBD
Replications	3
Plot size	3.6 m × 10 m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	February, 2015
Replications	3

METHODOLGY

The ratoon will be maintained from the previous crop of final varietal trial. The crop will be allowed to grow under uniform inputs and agronomic practices. The data on stubble sprouting, cane stand, yield and quality will be recorded during the course of study.

PREVIOUS YEAR'S
On the basis of preliminary observations on growth and RESULTS

S.No	Variety/clones	Sprouts/ plant	Cane count (000 ha^{-1})	Cane Yield (t ha^{-1})
1	S2006SP.93	2.53a	108.15	108.52a
2	S2006US.272	2.68a	101.39	106.76a
3	S2006US.469	1.84b	110.74	100.83b
4	S2006US.658	1.94b	102.69	110.46a
5	S2008Aus.135	1.67b	103.15	91.67c
6	S2008Aus.138	2.61a	107.04	98.52b
7	S2008Aus.190	2.79a	105.19	82.69d
8	SPF.234	1.04c	103.52	101.48b
	LSD	0.35	N.S	03.76

8 TITLE — EFFECT OF DIFFERENT PLANTING PATTERNS ON THE YIELD AND QUALITY OF SUGARCANE.

OBJECTIVES

To find out the most suitable planting geometry of sugarcane under southern Punjab conditions.

RESEARCH WORKERS

Muhammad Aslam, Muhammad Kashif Hanif and Dr. Naeem Ahmad

DURATION

2015-16

LOCATION

Sugarcane Research Station, Khanpur

TREATMENTS

Treatments = 6

P_1=Vertical planting of Unibudded setts,PxP= 12″
P_2= Vertical planting of Unibudded setts,PxP=24″
P_3= Horizontal planting with dry soil earthing up
P_4= Horizontal planting with wet soil earthing up
P_5= Horizontal placement of DBS opposite to rows
P_6= Control

Variety SPF.234
Layout RCBD
Replications 3
Plot size 3.6 m × 10 m
Fertilizer rate 168-112-112 Kg. NPK ha^{-1}
Seed rate in P_1=1666 Unibudded setts ha^{-1}
Seed rate P_2=8333 Unibudded setts ha^{-1}
Seed rate in P_3, P_4, P_5 and P_6=50000 TBS ha^{-1}
Planting time February, 2015

METHODOLGY	The experiment will be sown on a well prepared seed bed as per treatments under dry conditions. The crop will be allowed to grow at uniform inputs level and recommended agronomic practices. The data on cane germination, tillering, cane stand, yield and quality will be recorded during the course of study
PREVIOUS YEAR'S On the basis of preliminary observations on growth and RESULTS	New experiment.

9 TITLE **SUGARCANE VARIETAL TRIAL AT BAHAWALPUR(SET.I)**

OBJECTIVES	To evaluate the promising sugarcane clones/varieties for high cane and sugar yields.
RESEARCH WORKERS	Abdul Rashid Zahid and Dr. Naeem Ahmad
DURATION	Continuous nature (2015-16)
LOCATION	Sugarcane Research Sub-Station, Bahawalpur
TREATMENTS	Varieties/clones 10 i.e., S2009SA.8, S2009SA.41, S2009SA.57, S2009SA.67, S2009SA.79, S2009SA.111, S2009SA.169, S2009SA.171.SL.96-128 and SPF.234(Check)

Layout	RCBD
Replications	3
Plot size	3.6m × 10m
Seed rate	50000 TBS ha^{-1}
Fertilizer rate	168-112-112 Kg. NPK ha^{-1}
Planting time	February 2015

METHODOLGY	The experiment will be sown on a well prepared seed bed in 1.20 m apart trenches (15-20 cm deep) under dry conditions. The varieties will be allowed to grow at uniform inputs level and recommended agronomic practices. The data on cane germination, tillering, cane stand, yield and quality will be recorded during the course of study
PREVIOUS YEAR'S **On the basis of preliminary observations on growth and RESULTS**	The experiment is yet to be harvested.

10	**TITLE**	**SUGARCANE VARIETAL TRIAL AT BAHAWALPUR (SET.II)**
	OBJECTIVES	To evaluate the promising sugarcane clones/varieties for high cane and sugar yields.
	RESEARCH WORKERS	Abdul Rashid Zahid and Dr. Naeem Ahmad
	DURATION	Continuous nature (2015-16)
	LOCATION	Sugarcane Research Sub-Station, Bahawalpur
	TREATMENTS	Varieties/clones 8 i.e., S2008Aus.129, S2008Aus.130, S2008Aus.133, S2008Aus.134, S2008Aus.135, S2008Aus.138, S2008Aus.190, and SPF.234(Check)
		Layout: RCBD Replications: 3 Plot size: 3.6m × 10m Seed rate: 50000 TBS ha^{-1} Fertilizer rate: 168-112-112 Kg. NPK ha^{-1} Planting time: February 2015
	METHODOLGY	The experiment will be sown on a well prepared seed bed in 1.20 m apart trenches (15-20 cm deep) under dry conditions. The varieties will be allowed to grow at uniform inputs level and recommended agronomic practices. The data on cane germination, tillering, cane stand, yield and quality will be recorded during the course of study
	PREVIOUS YEAR'S RESULTS	The experiment is yet to be harvested. **On the basis of preliminary observations on growth and**