Bidhan Chandra Krishi Viswavidyalaya

Directorate of Research,

P.O. : Kalyani, Pin-741 235, Dist.: Nadia, West Bengal

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E-mail : bckvdr@gmail.com,

Prof. Sushanta Kumar Sarkar

Director of Research(Actg.)

Ref. No. DR /S-1426/19/(NGO)/ 159 Date: 31.07.2020

To

Mr. S.Mukherjee

Sheena Biotech Pvt. Ltd.(Sheena Seeds)

HO-Plot No.-2,Defence Colony

Hayathnagar, Hyderabad-501505

India

Sub:-**Project Report on evaluation of hybrid maize seed (2019-20)**– reg.

Sir,

Please find herewith a copy of project report of trials conducted under the Ad-hoc Research Project entitled **"Experimental evaluation of hybrid maize seeds"** under the supervision of Dr. Soumen Bera, Assistant Professor in Agronomy, College of Agriculture (extended campus of BCKV)Agricultural Farm Gate no 1, Kalna Road, Burdwan.and PrincipalInvestigator of the said project for your kind perusal.

Thanking you,

Yours faithfully,

31/07/2020

(Director of Research)

REPORT ON

Experimental evaluation of hybrid maize seeds

Sponsored by

Sheena Biotech Private Limited

D.No.5-85/6, Plot No: 241, Lakshma Reddy Palem, Pedda Amber Pet, Ranga Reddy (D), Hyderabad- 501505, Telangana, India

PRINCIPAL INVESTIGATOR

Dr. Soumen Bera

CO-PRINCIPAL INVESTIGATOR

Dr. Sibsankar Das

DEPARTMENT OF AGRONOMY
COLLEGE OF AGRICULTURE, EXTENDED CAMPUS OF
BIDHAN CHANDRA KRISHI VISWAVIDYALAYA
EAST BURDWAN, WEST BENGAL, INDIA-713101

Annual Report 2019-20

Sheena Biotech Private Limited Maize Trial

1.	**Title of the Project**	:	Experimental evaluation of hybrid maize seeds
2.	**Objective of the Project**	:	Comparative field evaluation of different maize cultivars.
3.	**Principle Investigator**	:	Dr. Soumen Bera, Assistant Professor, Department of Agronomy, College of Agriculture (Extended Campus of BCKV), Agricultural Farm, Gate no 1, Kalna Road, Burdwan, 713101, W.B.
4.	**Co-Principal Investigator**	:	Dr. Sibsankar Das, Assistant Professor, Department of Horticulture/ Forestry, College of Agriculture (Extended Campus of BCKV), Agricultural Farm, Gate no 1, Kalna Road, Burdwan, 713101, W.B.
5.	**Location of the experiment**	:	Teaching Farm, College of Agriculture under BCKV, Burdwan Sadar, Farm Gate 1, Kalna road, 713101, W.B. Farm situation is 23°14'37"N 87°53'48"E with an altitude of 9.75 m above MSL
6.	**Implementing Organization**	:	Department of Agronomy, College of Agriculture (Extended Campus of BCKV), Agricultural Farm, Gate no 1, Kalna Road, Burdwan, 713101, W.B.
7.	**Sponsoring Organization**	:	Sheena Biotech Private Limited, D.No.5-85/6, Plot No: 241, Lakshma Reddy Palem, Pedda Amber Pet, Ranga Reddy (D), Hyderabad- 501505,Telangana, India.
8	**Sanction Memo No.**	:	Ref. No. DR/S-1426/19 (NGO)/576/5 Dated 10.12.2019 **(Date of Start: 12.12.2019)**

Abbreviations used in this Report

%	:	Percentage	RH	:	Relative humidity
&	:	And	^{0}C	:	Degree Celsius
etc.	:	Etcetera	Min.	:	Minimum
CD	:	Critical difference	Max.	:	Maximum
a.i.	:	Active ingredient	t	:	Tonne
@	:	At the rate of	g	:	Gram
DAS	:	Days after sowing	kg	:	Kilogram
ha	:	Hectare	mm	:	Millimeter
L	:	Litre	cm	:	Centimeter
ml	:	Millilitre	m	:	Meter

Soumen Bera

SOUMEN BERA
Investigator
"Exper... ...ize seeds"
...404

DETAILS OF THE EXPERIMENT

Season	:	*Rabi*, 2019-20
Location of the Experiment	:	Teaching Farm, College of Agriculture under BCKV, Burdwan Sadar, Farm Gate 1, Kalna road, 713101, W.B
Design of the Experiment	:	Randomized Block Design (RBD)
Variety	:	4
Replications	:	5
Plot size	:	6 m x 5 m
Spacing	:	60 cm x 20 cm

Crop	Date of sowing	Date of harvesting	Duration
Maize	15.12.2019	18.04.2020-21-05.2020	125-158 days

Variety details:

Variety		Produced By
V_1	DKC9081	Monsanto India Ltd.
V_2	P3396	PHI Seeds Pvt. Ltd.
V_3	Heera 1122	Sheena Biotech Pvt. Ltd.
V_4	Guru 99	Sheena Biotech Pvt. Ltd.

Soil and Climate:

Experimental Soil: The soil of the experimental field was sandy loam in texture with a normal pH and medium fertility status with low water holding capacity. The crop was grown under irrigated condition. The Physico-chemical properties of the initial soil of the experimental field are presented below.

Physico-chemical properties of the initial soil of the experimental field

A. Physical characteristics:		
Textural Class	:	Sandy loam (*Inceptisol*)
Sand (%)	:	52.5
Clay (%)	:	24.4
Silt (%)	:	23.1
B. Chemical properties:		
pH	:	6.97
Organic Carbon (%)	:	0.592
Total Nitrogen (%)	:	0.0592
Available Phosphorus (kg ha^{-1})	:	26.94
Available Potash (kg ha^{-1})	:	132.84

Climatic condition of the experimental plot: The climate of the *Inceptisol* of West Bengal is typical warm and humid. The average maximum temperature starts falling from June and reaches minimum in

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January. The mean monthly rainfall is higher in July-August and lower in December. The average rainfall is 1700 mm per annum of which around 70 % rainfall occurs during June to September. The lowest relative humidity is observed in the month of December while the maximum is in July-August.

Meteorological Data (Weekly Basis):

Year	Week	Avg. Relative Humidity (%)	Avg. Temperature Maximum (°C)	Avg. Temperature Minimum (°C)	Total Rainfall (mm)
2019	*SMW49	76.81	25.53	14.02	0.00
2019	SMW50	79.47	24.82	15.52	1.67
2019	SMW51	76.93	21.07	9.54	0.00
2019	SMW52	76.58	20.27	7.91	9.94
2020	SMW1	78.26	21.92	10.76	18.88
2020	SMW2	71.00	20.80	8.48	3.48
2020	SMW3	68.56	24.62	11.68	0.04
2020	SMW4	63.71	23.12	8.98	0.12
2020	SMW5	64.60	23.57	10.85	9.35
2020	SMW6	60.99	24.16	10.67	0.29
2020	SMW7	56.84	26.68	10.31	0.00
2020	SMW8	61.70	28.81	15.72	2.45
2020	SMW9	59.25	28.95	16.04	8.36
2020	SMW10	66.67	29.65	17.60	36.29
2020	SMW11	60.90	31.69	18.95	6.15
2020	SMW12	50.84	32.72	18.60	7.18
2020	SMW13	44.01	36.83	20.36	0.00
2020	SMW14	37.49	38.50	21.39	0.63
2020	SMW15	43.50	39.14	22.72	3.89
2020	SMW16	50.77	39.42	24.81	34.71
2020	SMW17	64.37	34.67	23.72	41.32
2020	SMW18	62.37	35.25	23.83	28.80
2020	SMW19	55.54	37.37	24.58	43.37
2020	SMW20	56.34	38.94	25.50	16.87
2020	SMW21	73.04	35.35	25.16	90.20
2020	SMW22	66.07	37.07	26.66	37.16
2020	SMW23	60.90	37.32	27.13	15.21
2020	SMW24	80.00	33.32	27.18	113.34
2020	SMW25	80.99	32.98	26.40	53.43
2020	SMW26	81.44	33.18	26.31	49.71

***SMW: Standard Meteorological Week**
Source: District Seed Farm, Purba Burdwan, West Bengal.

Agronomic Practices: All the recommended improved package of practices of maize was followed in this experiment including the general plant protection measures. One day before sowing, the seeds were treated by using *Trichoderma viridi* @ 4 g kg^{-1} of maize seed. The treated seeds were kept under shade for overnight before sowing. For insect and disease pest control pesticides were applied two weeks after the herbicide application.

Fertilizer application: FYM @ 12.5 t ha^{-1} and *Azospirillum* (2000 g/ha) were applied and incorporate in the soil. In general, a balanced application of 120:60:40 kg/ha of NPK is recommended. One-

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fourth of nitrogen and the total quantity of phosphorus and potash were applied before sowing. The rest of the nitrogen was applied in two equal doses. Half of the total nitrogen (60 kg N ha^{-1}) was top-dressed at knee-high stage, while the rest of the nitrogen was applied with the emergence of the flag-leaf. Nitrogen in the form of urea was carefully applied 15-20 cm away from the plants to avoid any leaf injury.

Weed management: Broad leaved weeds and most of the grasses were conveniently controlled with the application of Atrazine @ 1kg/ha before seedling emergence. In addition, 1 or 2 inter-cultivations were also done to keep the weeds under control.

Irrigation schedule: Timely availability of assured irrigation is one of the major factors determining the success to crop. Six irrigations were applied during the *Rabi* crop season. They were applied at the following crop growth stages

- Two irrigations up to flowering at an interval of 20-25 days
- One (essential) at the time of flowering
- Two after flowering
- One at early grain filling

Plant Protection

Disease: No disease was observed

Insect pests: Maize grown in Rabi is known to be free from the attack of any major insect pests that usually affect the Kharif crop. However, one borer, *Chilo partellus* attack was observed. Treatment with Endosulfan (35EC) 0.1% spray on 10-15 days old crop followed by 4% Endosulfan granules @ 15kg/ha in the whorls 15 days later reduced in substantially reducing the loss due to these borders.

Observation on Growth Parameters: Different growth parameters regarding Plant population m^{-2}, Days of 50% Tasseling, Days of 50% Silking, Days to Maturity and Plant Height was observed following scientific standard methods.

Observation on Yield Parameters: Following standard methods, Ear height (cm), No of Cobs/plant, Cob length (cm), Cob diameter (cm), Kernel rows/cob, No of grains /kernel rows and 1000 grain weight (g) was recorded.

Yield: The grain and straw yield of maize were recorded separately for each plot and converted to per hectare basis.

Results

Variety DKC9081 recorded least days for 50% tasseling (82 days) and silking (85 days) along with total maturity period (125 days). Whereas P3396, Heera 1122 and Guru 99 recorded statistical parity among themselves regarding 50% tasseling (91-94 days) and silking (95-97 days) along with

total maturity period (149-158 days). There was no significant variation regarding plant population. Guru 99 variety recorded significantly highest height (i.e., 279.4 cm) among the varieties.

There was no statistical significance regarding number of cobs per plant, cob diameter and kernel rows per cob among the maize varieties. Maize variety Guru 99 recorded significantly promising results regarding Ear height, cob length, number of grains per kernel rows and 1000-grain weight. Regarding the above-mentioned parameters, Variety Guru 99 was closely followed by Heera 1122 and DKC 9081.

Maize Yield

Among the tested varieties, Guru 99 recorded the highest grain yield (6.603 t/ha) followed by Herra 1122 (6.053 t/ha). However the variety Herra 1122 and DKC9081 are statistically at par among themselves. Guru 99 recorded 11.24% higher grain yield as compared to best check i.e., DKC 9082. Similar kind of result was found in case of straw yield of maize.

Table 1: Growth parameters of Maize

	Cultivar	Plant population m^{-2}	Days of 50% Tasseling	Days of 50% Silking	Days to Maturity	Plant Height
V_1	DKC9081	8.00	82	85	125	252.8
V_2	P3396	7.67	91	95	158	232.0
V_3	Heera 1122	8.00	93	96	152	253.6
V_4	Guru 99	8.33	94	97	149	279.4
SEm (±)		0.35	1.12	1.19	2.93	1.82
LSD (P=0.05)		NS	3.45	3.67	9.03	5.61
CV (%)		2.89	9.03	9.87	15.61	12.17

***NS: Not significant**

Table 2: Yield parameters of Maize

	Cultivar	Ear height (cm)	No of Cobs/plant	Cob length (cm)	Cob diameter (cm)	Kernel rows/cob	No of grains /kernel rows	1000 grain weight (g)
V_1	DKC9081	73	1.4	20.5	4.7	16	39	285.7
V_2	P3396	64	1.1	19.0	4.6	14	33	273.9
V_3	Heera 1122	72	1.2	21.0	4.8	14	36	289.1
V_4	Guru 99	74	1.6	22.5	5.0	16	41	296.3
SEm (±)		0.58	0.3	0.49	0.14	0.42	1.02	2.19
LSD (P=0.05)		1.79	NS	1.51	NS	NS	3.14	6.75
CV (%)		11.03	2.86	3.87	3.06	2.92	9.85	13.52

***NS: Not significant**

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Some selected photographs of experimental field

Heera 1122

P3396

DKC9081

Guru 99

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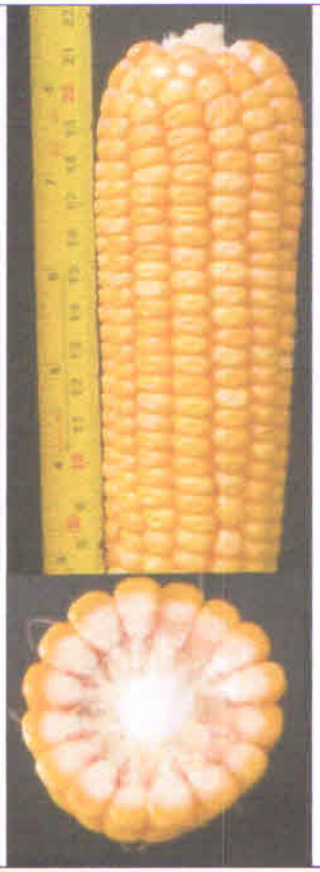	
Guru 99	**Heera 1122**
	
DKC9081	**P3396**

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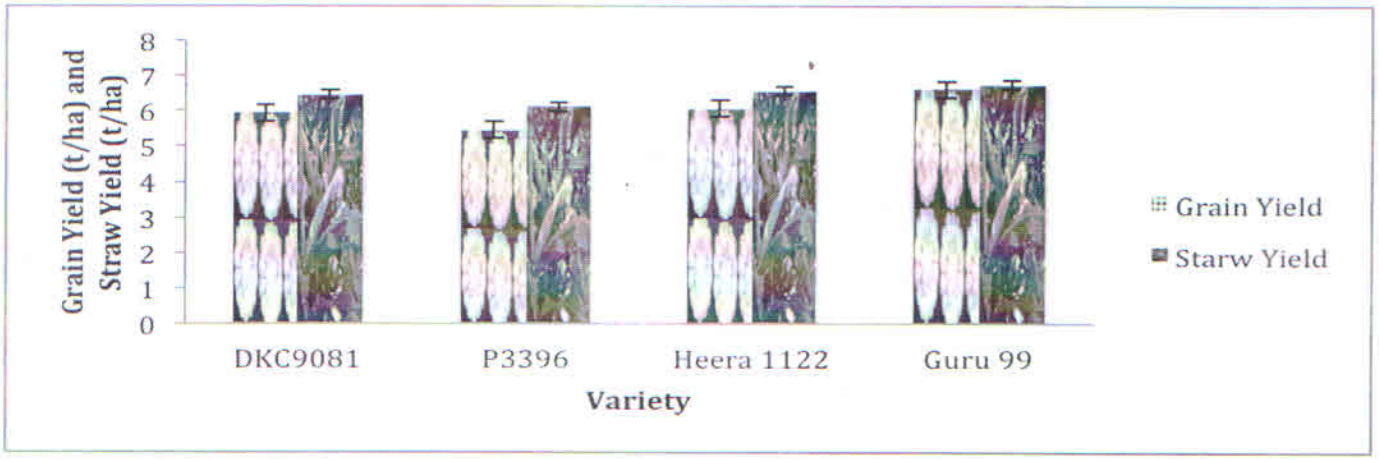
Table 3: yield (t ha^{-1}) of Maize

	Cultivar	Yield t/ha		Rank	% Increase in grain yield over best check
		Grain	Straw		
V_1	DKC9081	5.936	6.440	3rd	0.00
V_2	P3396	5.458	6.104	4th	-8.05
V_3	Heera 1122	6.053	6.555	2nd	1.97
V_4	Guru 99	6.603	6.730	1st	11.24
SEm (±)		0.13	0.15		
LSD (P=0.05)		0.40	0.46		
CV (%)		13.03	14.87		

Graph 1 Varietal performance of maize in respect to grain and straw yield



Conclusion

Based on the study entitled "Experimental evaluation of hybrid maize seeds", it has been observed that, Guru 99 variety of Sheena Biotech Pvt. Ltd. Resulted promising results in respect to yield parameters and yield among all the tested maize varieties. So, it can be concluded that Guru 99 can be successfully recommended to the farming community in *Rabi* season.

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