Original Research Article

Performance of different hybrids of sponge gourd (*~~l~~Luffa cylindrica*) ~~in~~ under Prayagraj Agro climaticconditions~~.~~

Abstract

An experiment was conducted to evaluate ~~performance~~ the performance of different hybrids of sponge gourd(~~l~~*Luffa~~cylindrica~~cylindrical* (L.) Roem.)inPrayagraj Agro-climatic conditions during *Rabi* season 2021-22. It wasconducted at the Vegetable Research Farm, Department of Horticulture Naini AgricultureInstitute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS),Prayagraj (U.P.). The experiment was laid in ~~randomized~~ a randomized block design with three replications.The result from the present investigation ~~it is concluded~~ revealed that among 14 hybrids of spongegourd, 2 hybrids ~~namely;~~namely AVT-II 2019 SPGHYB-5, and AVT-II 2019 SPGHYB-3 exhibitedsubstantially higher fruit yield per plant (4.66) and performed better for other desirable traitsin ~~p~~Prayagraj agro-climatic conditions. In terms of ~~economics~~ economics, the best benefit-cost ratio (4.14) was obtained byAVT-II2019 SPGHYB-5 ~~was found to bebestvariety~~ hybrid~~i.e., gives the~~ with high returns.

Keywords:Performance,hybrids,spongegourd(*Luffacylindrica*).

Introduction

In India, sponge gourd and ridge gourd are cultivated both as a single crop on arable groundand as a mixed crop in river bed cultivation. Sponge gourds can be grown in tropical andsubtropical climates, but they prefer warm, humid weather. Its growth is not suited to coolweather, low temperatures, or situations with frost. Nowadays, the sponge gourd is grownextensivelyformedicalpurposesinMalaysia,Korea,Japan,India,CentralAmerica,Thailand ,thePhilippines,Indonesia,Taiwan,andChina.Thelargestimportersofspongegourdare Brazilandth eUnitedStates,whereasJapanisthemainexporter.Thecropiswidelyfarmedthroughout India,particularlyinUttarPradesh,Bihar,WestBengal,Orissa,Assam,andKerala.

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Spongegourd[*Luffacylindrica*(L.)Roem.],isaherbaceousvineofCucurbitaceaefamily.Thecross-pollinatedcropLuffaisadiploidspecieswith26chromosomes(2n = 26).Theexactsizeand production of sponge gourds in our country are unknown, but the estimated area under allgourdsis4.05lakhhectares.Spongegourdsareproducedasmixedcroppinginriverbanksandasam ono crop in gardenareas.

In India, sponge gourds are grown in household gardens and on a commercial basis. Bothspecies include luffein, a gelatinous substance. The genus derives its name from the product'loofah', which is used in bathing sponges, scrubber pads, doormats, pillows, and mattressesand also for cleaning utensils. Luffa requires a long warm season for best production. It alsogrows best during the rainy season. Low temperatures are difficult for seed germinationbecause of the strong seed coat. When cultivated on sandy loam soil, it produces the finestresults. The ability of the soil to retain moisture is important, especially during the summer.For plantations, soil with a pH between 6.5 and 7.0, or neutral to slightly alkaline soil, is best.Its growth requires temperatures between 25 and 28 degree~~s~~ Celsius. In general, irrigationshould be administered based on the kind of soil and the weather. In prolonged dry spells,irrigationshouldbecarriedouttwiceweekly~~;~~ ; duringtherainyseason,irrigationisnotnecessary. However, mulching can be used to avoid water loss or manage weeds in extremelyhotclimates.Farmersuselivingtree,deadbranches,awallorroofforsupportingtheclimbin gvines.

This study aimed to evaluate performance of different hybrids ~~I~~in terms of growth, yield andqualityof spongegourd and to estimatetheeconomics of various hybrids.

MaterialandMethods

The experiment was conducted during the *Rabi* Season of 2022 at the Research FieldDepartmentofHorticulture,SamHigginbottomUniversityofAgriculture,TechnologyandScienc es, Prayagraj using ~~randomized~~ a randomized block design with three replications. During the period of~~experimental~~the experimental trail,the maximum temperature of the location reachesupto45ºC–50ºCandseldom falls as low as 02 ºC – 05 ºC. The relative humidity ranges between 19 to 90 percent. The averagerainfallsinthisarea ~~are~~ isaround 1013.4mm annually.

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Table1. List ofspongegourdHybrids

HybridSymbol	NameofHybrids	Source
G1	AVT-12020SPGHYB-1	IIVR,Varanasi
G2	AVT-12020SPGHYB-2	IIVR,Varanasi
G3	AVT-12020SPGHYB-3	IIVR,Varanasi
G4	AVT-12020SPGHYB-4	IIVR,Varanasi
G5	AVT-12020SPGHYB-5	IIVR,Varanasi
G6	AVT-12020SPGHYB-6	IIVR,Varanasi
G7	AVT-12020SPGHYB-7	IIVR,Varanasi
G8	AVT-22019SPGHYB-1	IIVR,Varanasi
G9	AVT-22019SPGHYB-2	IIVR,Varanasi
G10	AVT-22019SPGHYB-3	IIVR,Varanasi
G11	AVT-22019SPGHYB-4	IIVR,Varanasi
G12	AVT-22019SPGHYB-5	IIVR,Varanasi
G13	AVT-22019SPGHYB-6	IIVR,Varanasi
G14	ALOK	VNR Seeds Ltd

IIVR: ICAR-Indian Institute of Vegetable Research; VNR: Vegetable N Rice.

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~~The data were subjected to analysis of variance according to Panse and Sukhatme (1967). Thegenotypicandphenotypiccoefficientsofvariationwerecomputedaccordingto BurtonandDevane(1953). The broad sense heritability was computed according to Falconer and Mackay (1996).Geneticadvance overmean wasworked outaccordingto Johnson*etal*. (1955).~~

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ResultandDiscussion

The salient results of the study and conclusion drawn from the experiment are summarizedbelow:

Analysis of variance showed significant differences among the hybrids for the twenty-onecharacters ~~studied,~~studied. Analysis of variance showed ~~significant~~ a significant difference among the hybrids forthedifferent characters at1%significance.

Table2.MeanPerformanceofdifferenthybridsofspongegourdon growthandearliness parameters

Sl. No.	NameofGenotype	Days ~~Taken~~takentoGermination	Daysto1st leafemergence	No. ofprimarybranchesperplant	No. ofnode/plant	VineLength(cm)atFinalHarvest	Days toemergenceof1st male flower	Das toemergenceof 1st female flower	Node No. at1st male flower	Node No at1st female flower	Daysto firstfruitpicking
1	AVT-I/2020/SPGHYB-1	9.75	13.25	5.17	44.50	430.83	44.17	48.17	4.58	6.42	56.00
2	AVT-I/2020/SPGHYB-2	9.92	14.00	5.50	43.67	305.58	43.33	49.17	4.58	8.42	62.42
3	AVT-I/2020/SPGHYB-3	11.50	14.33	7.33	49.50	286.42	42.67	47.42	5.25	5.67	59.67
4	AVT-I/2020/SPGHYB-4	8.58	13.33	5.75	44.83	293.92	43.83	49.58	4.33	5.33	58.75
5	AVT-I/2020/SPGHYB-5	9.83	13.75	4.33	41.75	362.25	43.67	51.00	6.33	7.08	55.83
6	AVT-I/2020/SPGHYB-6	9.33	13.75	5.50	42.42	304.00	44.50	48.67	4.08	6.33	55.67
7	AVT-I/2020/SPGHYB-7	9.08	15.42	4.67	43.83	268.25	45.33	48.58	5.25	6.42	54.75
8	AVT-II/2019/SPGHYB-1	9.42	13.17	5.42	44.67	269.17	43.33	48.50	5.17	8.08	53.42
9	AVT-II/2019/SPGHYB-2	10.00	12.92	5.75	45.33	340.83	43.83	48.33	4.92	6.75	54.17
10	AVT-II/2019/SPGHYB-3	10.17	13.75	5.92	45.75	438.75	44.00	51.42	6.25	5.92	58.00
11	AVT-II/2019/SPGHYB-4	9.75	13.75	7.58	49.67	278.50	45.25	47.17	4.25	5.42	56.92
12	AVT-II/2019/SPGHYB-5	8.25	15.33	5.92	43.25	329.92	42.50	48.92	5.33	6.42	62.58
13	AVT-II/2019/SPGHYB-6	8.75	14.50	5.50	44.33	385.67	43.50	47.33	4.92	5.75	54.00
14	ALOK[VNR]	9.67	12.00	4.08	42.50	298.58	45.08	48.17	4.83	7.17	54.92
F-Test		S	S	S	S	S	S	S	S	S	S

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C.V. (%)	5.38	3.07	8.54	2.61	13.42	0.57	1.00	7.38	7.59	2.7
SE.d±	0.42	0.34	0.39	0.95	35.95	0.20	0.39	0.30	0.40	1.25
C.D.at5%	0.86	0.71	0.80	1.96	73.90	0.42	0.81	0.62	0.82	2.58

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Table3.MeanPerformanceofdifferent hybridsofspongegourdon yield andqualitativeparameter

Sl. No.	NameofGenotype	No. offruitsper plant	Fruitweightof1fruit(g)	Fruityield perplant (~~K~~kg)	Fruit length (cm)	Fruitdiameter(cm)	Fruityieldper plot(kg)	Fruit yield(q/ha)	Ascorbic acid	TSS(Brix)
1	AVT-I/2020/SPGHYB-1	24.33	161.08	3.92	11.68	3.53	15.67	112.05	8.67	10.00
2	AVT-I/2020/SPGHYB-2	27.25	120.33	3.95	10.88	3.87	15.79	112.94	8.33	10.67
3	AVT-I/2020/SPGHYB-3	27.42	119.75	3.86	11.16	3.63	15.43	110.32	9.33	9.33
4	AVT-I/2020/SPGHYB-4	27.50	155.08	4.27	11.76	3.70	17.07	121.99	9.67	10.00
5	AVT-I/2020/SPGHYB-5	28.08	116.50	4.37	9.91	3.89	17.47	124.95	11.00	10.00
6	AVT-I/2020/SPGHYB-6	22.50	138.67	3.46	10.20	3.40	13.80	98.74	8.67	9.67
7	AVT-I/2020/SPGHYB-7	23.08	162.58	3.84	10.83	4.04	15.35	109.67	9.67	9.67
8	AVT-II/2019/SPGHYB-1	27.08	166.83	4.52	10.29	4.10	18.07	129.13	11.67	10.00
9	AVT-II/2019/SPGHYB-2	27.17	165.08	4.49	11.43	3.39	17.92	128.14	8.67	11.33
10	AVT-II/2019/SPGHYB-3	29.00	161.00	4.66	11.21	3.52	18.63	133.15	9.67	9.33
11	AVT-II/2019/SPGHYB-4	26.33	165.42	4.36	11.28	3.64	17.41	124.45	10.33	9.67
12	AVT-II/2019/SPGHYB-5	27.25	166.83	4.66	11.19	4.16	18.64	133.21	9.00	9.00
13	AVT-II/2019/SPGHYB-6	27.42	164.42	4.44	9.85	3.57	17.73	126.82	10.33	9.33
14	ALOK[VNR]	29.00	157.92	4.53	10.76	3.87	18.12	129.44	10.00	10.00
F-Test		S	S	S	S	S	S	S	S	NS
C.V. (%)		1.07	3.01	6.86	3.94	6.80	6.87	6.86	9.61	9.98
SE.d±		0.23	3.72	0.23	0.35	0.20	0.95	6.78	0.75	0.80
C.D.at5%		0.48	7.65	0.48	0.72	0.42	1.95	13.95	1.55	1.65

Table4Fruit ColourandFruitShapeof spongegourd hybrids

HybridSymbol	NameofGenotype	FruitColour	FruitShape
G1	AVT-12020/SPGHYB-1	Greenish	LongCylindrical
G2	AVT-12020/SPGHYB-2	DarkGreen	MediumCylindrical
G3	AVT-12020/SPGHYB-3	Greenish	LongCylindrical
G4	AVT-12020/SPGHYB-4	Greenish	LongCylindrical
G5	AVT-12020/SPGHYB-5	DarkGreen	SmallCylindrical
G6	AVT-12020/SPGHYB-6	Greenish	MediumCylindrical
G7	AVT-12020/SPGHYB-7	LightGreen	MediumCylindrical
G8	AVT-22019/SPGHYB-1	Greenish	SmallCylindrical
G9	AVT-22019/SPGHYB-2	DarkGreen	LongCylindrical
G10	AVT-22019/SPGHYB-3	DarkGreen	LongCylindrical
G11	AVT-22019/SPGHYB-4	Greenish	MediumCylindrical
G12	AVT-22019/SPGHYB-5	Greenish	LongCylindrical
G13	AVT-22019/SPGHYB-6	DarkGreen	LongCylindrical
G14	ALOK[VNR]	Greenish	SmallCylindrical

Theresultsof~~present~~the presentstudy~~also~~revealedthatoutof14hybridsofspongegourd,2genotypesnamely;AVT-II2019SPGHYB-5(4.66kg/plant),and AVT-II2019SPGHYB-3(4.66kg/plant)possessedmaximum fruit yield per plant**.** Therefore, these genotypes may be promoted forcultivationaswellasinfuturebreedingprogrammetodevelopsuperiorvarietiesforeasternplainzone sof UttarPradesh.

A wide range of variability in sponge gourd (*~~luffa~~L.cylindrica*) was observed fordifferentcharacters*viz*.daystakentogermination(8.25-11.50),daysto1st leafemergence(12.00–15.42 days), number of primary branches per plant (4.08-7.58), number of nodes/plant (41.75 – 49.67nodes), vine length(m) at final harvest stage (268.25-438.75 cm), days to emergence of 1st male flower (42.50 – 45.33 days), days to emergence of 1st female flower (47.17 – 51.42days), node number at which 1st male flower in appear (4.08-6.33 nodes),

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node number at which 1st femaleflowerinappear(5.33-8.42nodes),daystofirstfruitpicking(53.42-62.58days), number of fruits per plant (22.50 – 29.00 fruits), fruit weight of one fruit (116.50-166.83 g),fruit length (cm) (9.85-11.76), fruit diameter (cm) (3.39-4.16), fruit yield per plot (13.80-18.64kg),fruityield(98.74-133.21q/ha),TSS(9.00-11.33Brix), andascorbicacid(%)(8.33-11.67).

Significant positive association of these above attributes indicated that these attributes weremainlyinfluencingthefruityieldinbittergourd.Thus,selectionpracticedfortheimprovement inone character will automatically result in the improvement of the othercharacter even if direct selection for improvement has not been made for the yield character.Thesignificantcorrelationatboththelevelsbetweenaboveattributingcharacterscanbeu sedfor simultaneous improvementin both the characters with selection for one character onlywhileselectionforcorrelatedcharactermaynotbedone.However,significantcorrelationonly atthe genotypic level reflects the maskingeffectsof theenvironment.

Conclusion

Fromthepresentinvestigationitisconcludedthatamong14hybridsofspongegourd,2hybridsnamely; AVT-II 2019 SPGHYB-5, and AVT-II 2019 SPGHYB-3 exhibited substantially higherfruit yield per plant (4.66) and performed better for other desirable traits in ~~p~~Prayagraj agro-climatic conditions. In terms of economics, the best benefit-cost ratio (4.14) was obtained by AVT-II 2019SPGHYB-5 ~~was found to be best variety~~ hybrid ~~i.e., gives the~~ with high returns. The analysis of variancefor all characters of sponge gourd hybrids revealed presence of ~~good~~ a good ~~extant~~ extent of significantdifferencesamongthehybridsforalltraits.~~Henceforth,thedataforallcharactersthatshowed sufficientamountofsignificantdifferenceswaresubjectedtofurtherstatisticalanalysis.~~

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