Original Research Article

"INFLUENCE OF WEATHER PARAMETERS OF GROWTH AND YIELD ATTRIBUTE OF DIFFERENT SOWING DATE ON DIFFERENT VARIETIES OF PEA PLANT"

ABSTRACT:

A field experiments was conducted during winter seasons of 2021-22 at Agricultural Research Farm of Sam Higginbottom University of Agriculture Technology and Science, Prayagraj (U.P) **"**Influence of weather parameters of growth and yield attribute of different sowing date on different varieties of pea plant" Keeping in this view experiment was conducted in Factorial RBD with three replications having two factors.

First factor comprised of three dates of sowing (3RDNov. 13THNov and 23RDNov.) whereas second factor consist of three Field pea varieties SS-10, GS-10, RONALDO-10.Crop sown on 13th November was recorded significantly higher yield as compared to 3rd November and 23rd November. For plant growth parameters of Pea maximum was recorded in 13th November as compared to 3rd November and 23rd November and in case of variety maximum plant height, no of leaves, no of branches grain yield ,test weight recorded with Ronaldo-10 as compared to GS-10 and SS-10. ~~with~~With Ronaldo-10 variety proved the most remunerative and economically feasible for cultivation of Field Pea under the agro climatic conditions of Prayagraj U.P. Growing Degree Days (GDD) or effective heat units or growing degree units are heuristic tool in phenology. It is a simple means of relating plant growth, development and maturity to air temperature.

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Keywords: P~~p~~lant ~~h~~Height, N~~no~~umber~~,~~ of ~~l~~Leaves, N~~no~~umber~~,~~ of ~~b~~Branches, H~~h~~eat ~~u~~Unit, N~~u~~umber~~o~~. of _____ ~~p~~Pods ~~etc~~.

INTRODUCTION:

Pea(*Pisum sativum L.),Family-Fabaceae* is a leguminous, annual herbaceous plant with one –year life cycle .Pea is considered as cool season crop with planting taking place from winter to early summer depending on the location.They are cultivated for fresh green seeds, tender green pods, dried seeds and foliage. Green pea consumes as a raw or cooking vegetable separate or mix with potato, cheese, cauliflower and many other vegetables or as a conserved, frozen product, dry seed as food, hay feed for animals and green fertilizer (*Bozoglu et al.*, 2007). Edible pea pods include snow peas and sugar snap peas. Some varieties with very small peas are available. Small peas are not necessarily sweeter, tender or better flavoured than larger peas. Pea is grown as vegetable in various states of India. Uttar Pradesh is a major field pea producing state in India producing about 60% of the country's produce. In Uttar Pradesh, Jalaun district contributes highest in terms of area and production by 21% and 29% respectively to the state total area and production of field pea. The other major pea growing states are Bihar, Haryana, Punjab, H.P. Orissa, and Karnataka. Stages of pea plants: young pea plants develop vines, leaves and tendrils in either bush form or vines. We should set up a structural support for taller pea vines. Pea plants that get proper sun ex posture and regular water will produce flowers. As petals fall, the bases of the blossom develop into the pea pods. Field pea is an annual, cool season pulse grain and can be of the indeterminate (climbing) type or determinate (bush or dwarf) type. The majority of pea plants exhibit an indeterminate growth habit (Cousin 1997). Most cultivars of pea produce white or reddish-purple flowers, which are self-pollinated. Each flower produces a pod containing four to nine seeds (Zohary and Hopf 2002).

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MATERIAL AND METHODS

The present investigation **on "Influence of Wweather Ppparameters on gGrowth and Yyield Aattribution of dDifferent sShowing dDate on Ddifferent vVarieties of pPea Pplant"** was conducted out at the Research farm, of College of Forestry, SHUATS Prayagraj (U.P). The methods employed during the course of investigation and materials utilized have great significance in the research programmers.

The experiment was conducted during Rabi season 2021-2022 at Forest Nursery, SamHigginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj. U.P. which is, located at 25□87□ N latitude. 81°150' longitude and 98m altitude above the mean sea level. This area is situated on the right sight of the river Yamuna at Prayagraj Rewa road national highway at a distance about 5 km away from Prayagraj.

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Prayagraj features the typical version of a humid sub-tropical climate that is common to cities in north-central India. Prayagraj features the typical version of a humid sub-tropical climate that is common to cities in north-central India. Prayagraj experiences three seasons: hot dry summer, cool dry winter and warm humid monsoon. During winter months especially Dec-Jan temperature drops down to as low as 2.5-4.5°C winter rains are inadequate to cropping. The average rainfall, relative humidity, minimum and maximum temperature as recorded. The summer season lasts from April –June with the maximum temperature ranging from 40-45□C. Monsoon begin in early July and lasts till September. The average monthly rainfall, relative humidity, minimum and maximum temperature recorded at Department of Agroforestry and Agro meteorology Observatory Unit, SHUATS. *Field pea* cultivars namely ss-10, gs-10, Ronaldo-10, peas were sown during rabi season at 10 days' intervals on three dates of sowing beginning 3rd November 2021. The field experiment was conducted in a RBD in which three varieties and three sowing dates were replicated three times. Fertilizers were applied as per recommended agronomic package of practices for the experiment i.e. nitrogen @ 20 kg/ha, P_2O_5 60 kg/ha and K_2O 40 kg/ha and 20 kg Sulphur. Seeds were sown at the rate of 6 kg seed per hectare in rows spaced 40 cm, plant to plant30 cm, apart and 3-4 cm deep by a hand drawn drill. Weeding was carried out manually at about 40 days after seeding and thinning was done to maintain plant population.

The crop was irrigated during the two most critical growth stages viz. flowering and pod formation stages, as per recommended irrigation package of practices for the crop under prayagraj conditions.

RESULT AND DISSCUSSION:

Effect of Ssowing Ddates ~~on germinationon %~~Germination % of ~~v~~Varieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

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Table ~~No:~~1 observed that the ~~effect of different date of showing and varieties on germination percentage were~~effects of different date of showing and varieties on germination percentage were found significant. There is no significant result were observed for the interaction of date of sowing and varieties on germination percentage. The maximum germination percentage (77.00%) of seeds per plot was found in D1V3and the minimum germination percentage (66.00%) of seeds per plot was found in D3V2.

Support your discussions with relevant citations

Table ~~1 :~~1: Effect o~~O~~f Different Date o~~O~~f Showing ~~A~~and Varieties ~~O~~on Germination Percentage

TREATMENT	MEAN VALUE
T1(D1V1)	75.00
T2(D1V2)	72.33
T3(D1V3)	77.00
T49D2V1)	73.33
T5(D2V2))	69.66
T6(D2V3)	75.00
T7(D3V1)	70.33

T8(D3V2)	66.00
T9(D3V3)	71.66

Effect of Ssowing Ddates on Pplant hHeight of vVarieties of Field Pea (*Pisum sativum* L.) at Prayagraj for 30,60,90, 60,90 DAS

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From the tTable no 2, it is observed that the effectthe effect of showing date on plant height was found significant at 30,60, 60 and 90. From the table it also shows that the variety has significant effect on plant height from 30DAS to 90DAS. The interaction effect of sowing of sowing dates and varieties was found non-significant. The maximum plant height at 30,60, 60 and 90 DAS is 22.97,52.83, 107.58 cm .was found in D1V3 and the minimum plant height at 30,60, and 90 is 11.51,44.91,92.25 cm was found in D3V2. Support your discussions with relevant citations

Table 2 .2: Effect of Ssshowing dDate on pPlant hHeight

Treatment	Date	30 DAS	60DAS	90 DAS
T1(D1V1)	**3RD NOV**	18.43	51.58	98.04
T2(D1V2)	**3RD NOV**	16.11	47.91	96.08

T3(D1V3)	**3RD NOV**	22.97	52.83	107.58
T49D2V1)	**13TH NOV**	15.40	48.41	97.48
T5(D2V2))	**13TH NOV**	14.16	45.91	92.41
T6(D2V3)	**13TH NOV**	20.44	49.58	103.03
T7(D3V1)	**23RD NOV**	13.30	46.26	96.34
T8(D3V2)	**23RD NOV**	11.51	44.91	92.25
T9(D3V3)	**23RD NOV**	18.66	47.41	101.68

DAS: STATE THE MEANING AS FOOT NOTE

Effect of Ssowing ddDates on Nnumber of Bbranches of vVarieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

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From this tTable number 3, it may be observed that the effect of sowing date on number of branch was found non significant, the effect of varieties on number of branches was found significant. There were no significant result observed for the interaction of date of sowing and variety on the number of branches. The maximum number of branch (12.94) was recorded in D1V3 and the minimum number of branch (10.22) was found in D3V2. Support your discussions with relevant citations

Table 3.:3: Effect of sSowing dDate on nNumber of bBranch

TREATMENT	DATE	MEAN
T1(D1V1)	**3RD NOV**	12.48
T2(D1V2)	**3RD NOV**	10.55

T3(D1V3)	**3RD NOV**	12.94
T49D2V1)	**13TH NOV**	12.00
T5(D2V2))	**13TH NOV**	10.50
T6(D2V3)	**13TH NOV**	12.64
T7(D3V1)	**23RD NOV**	11.51
T8(D3V2)	**23RD NOV**	10.22
T9(D3V3)	**23RD NOV**	12.51

Effect of Ssowing ddDates on Nnumber of fFlowering (100) of) of Vvarieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

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Table number 4 observed that the effect on date of showing and the varieties onvarieties on flowering was found significant**.** The interaction effect of sowing dates and varieties was found significant.

The maximum flowering % (51.42) was found in D1V3 (3RD NOVEMBER + RONALDO-10) and the minimum flowering % (46.18) was found in D3V2 (23 RD NOVEMBER+GS-10). Support your discussions with relevant citations

Table 4: Effect on Ddate of sShowing and the Vvarieties on fFlowering

TREATMENT	DATE	MEAN VALUE
T1(D1V1)	**3RD NOV**	50.53

T2(D1V2)	**3RD NOV**	47.50
T3(D1V3)	**3RD NOV**	51.42
T49D2V1)	**13TH NOV**	47.29
T5(D2V2))	**13TH NOV**	46.39
T6(D2V3)	**13TH NOV**	50.70
T7(D3V1)	**23RD NOV**	45.19
T8(D3V2)	**23RD NOV**	46.18
T9(D3V3)	**23RD NOV**	50.40

Effect of Ssowing Ddates on Ppods per Pplant of Vvarieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

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From Ttable ~~number~~ 5 it is observed that the effect of date of sowing and varieties on number of pods per plant was found significant**.** The interaction effect of sowing dates and varieties was found significant. The maximum number of pod (35.70) was found in D1V3 and minimum number of pod (29.67) was found in D3V2. Support your discussions with relevant citations

Table 5: Effect of Ddate of ~~s~~Sowing and ~~v~~Varieties on ~~n~~Number of ~~p~~Pods per ~~p~~Plant

TREATMENT	DATE	MEAN
T1(D1V1)	**3RD NOV**	30.71
T2(D1V2)	**3RD NOV**	29.07
T3(D1V3)	**3RD NOV**	35.70
T49D2V1)	**13TH NOV**	30.64
T5(D2V2))	**13TH NOV**	27.58
T6(D2V3)	**13TH NOV**	34.15
T7(D3V1)	**23RD NOV**	30.58
T8(D3V2)	**23RD NOV**	26.76
T9(D3V3)	**23RD NOV**	31.67

Effect of Ssowing Ddates on ~~n~~Number of ~~s~~Seeds per ~~pods of~~Pods of ~~v~~Varieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

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From Ttable ~~number~~ 6 it may be observed that the effect of date of sowing and varieties on number of seeds per pods were found significant also ~~The~~the interaction effect of sowing dates and varieties was found significant. The maximum (10.56) seeds was found in D1V3 (3rd NOVEMBER+ RONALDO-10) and the minimum (6.78) seeds was found in D3V2 (23rd NOVEMBER+GS-10). Support your discussions with relevant citations

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Table 6 : Effect of Ddate of ~~s~~Sowing and ~~v~~Varieties on ~~n~~Number of ~~s~~Seeds per ~~p~~Pods

TREATMENT	DATE	MEAN
T1(D1V1)	3RD NOV	9.46
T2(D1V2)	3RD NOV	7.46
T3(D1V3)	3RD NOV	10.56
T49D2V1)	13TH NOV	9.43
T5(D2V2))	13TH NOV	7.17
T6(D2V3)	13TH NOV	10.54
T7(D3V1)	23RD NOV	8.55
T8(D3V2)	23RD NOV	6.78
T9(D3V3)	23RD NOV	9.88

Effect of Ssowing dDates on nNumber of Grain Yyield of vVarieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

From the Table No7 it may be observed that there is no significant relationship due to date of sowing on the number of grain yield. It also observed from the table that the variety has a significant effect on graigrain yield. No significant results were sown for the interaction of date of sowing and variety on the grain yield. The maximum grain yield (28.99) was found in D2V3 and the minimum grain yield (22.15) was found in D3V2.

Support your discussions with relevant citations

Table 7: Significant Rrelationship due to Ddate of sSowing on the nNumber of gGrain yYield

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TREATMENT	DATE	MEAN
T1(D1V1)	3RD NOV	23.20
T2(D1V2)	3RD NOV	24.64
T3(D1V3)	3RD NOV	28.20
T49D2V1)	13TH NOV	24.51
T5(D2V2))	13TH NOV	23.89
T6(D2V3)	13TH NOV	28.99
T7(D3V1)	23RD NOV	23.24
T8(D3V2)	23RD NOV	22.15
T9(D3V3)	23RD NOV	28

Effect of Ssowing ~~d~~Dates on Test ~~w~~Weight (gm.~~) of~~) of ~~v~~Varieties of Field Pea (*Pisum sativum* L.) at Prayagraj:

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The Ttable ~~No~~ 8 shows that The effect of sowing dates on test weight (gm.) was found non-significant. The effect of varieties on test weight (gm.) was found significant. The interaction effect of sowing dates in varieties was found significant. The maximum (100) seeds test weight (25.98) was found in D1V3 and the minimum (100) seeds test weight (22.99) was found in D3V2. Support your discussions with relevant citations

Table 8: Effect of Ssowing dDates on tTest wWeight

TREATMENT	DATE	MEAN
T1(D1V1)	3RD NOV	24.95
T2(D1V2)	3RD NOV	23.20
T3(D1V3)	3RD NOV	25.98
T49D2V1)	13TH NOV	24.13
T5(D2V2))	13TH NOV	23.08
T6(D2V3)	13TH NOV	25.95
T7(D3V1)	23RD NOV	23.63
T8(D3V2)	23RD NOV	22.99
T9(D3V3)	23RD NOV	25.97

Meteorological Iindices as Iinfluence by dDifferent Ddates of sSowing and vVarieties:

The maximum GDD, HTU , PTU CONSUMED CROP IS 1187.6(D1V1), 64.96.17(D1V1),1550.92(D1V3)and the minimum gdd htu ptu consumed crop is 949.2(D3V3), (5125.68)(D3V3),13004.04(D3V3).There is significant effect in relationship due to date of sowing on heat unit consumption was also entered from the table that variety has a significant effect on heat unit consumption.

Support your discussions with relevant citations

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Table 9 :9: Effect in rRelationship due to Ddate of Ssowing on Hheat uUnit

DATE OF SHOWING	GDD			HTU			PTU		
DAYS	V1	V2	V3	V1	V2	V3	V1	V2	V3
1st DOS	1187.6	1187.1	1187.6	6496.17	6444.2	6444.2	15438.8	15550.92	15550.92
2NDDOS	1019.3	1005.9	996.4	5463.44	5361.44	5310.81	13556.67	13378.47	13252.12
3RDDOS	993.2	978.3	949.2	5393.07	5312.16	5125.68	13606.84	13402.71	13004.04

eConsumption

CONCLUSION:

- **On the basis of finding of recent research work .it can be concluded that 2nd DOS (13th Nov 2021) was found most suitable period of sowing of field pea which resulted in maximum growth, yield and yield attributes with best use of Agro meteorological indices like GDD, PTU, HTU.**
- **Among varieties of pea plant , variety 3 (RONALDO-10) proved superior in growth, yield and yield attributes by utilizing the Agro meteorological indices and resources very efficiently.**
- **The cost benefit ratio are high ~~in T3~~in T3 DIV3 (3rd date of sowing and RONALDO-10.Based on their study we can recommended farmers around Prayagraj to prefer used of Ronaldo10variety and showing of field pea in the 1st and 2nd week of November for better result and yield. I recommend to the farmer to take the healthy seeds for more and growth and yield.**

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