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Evaluation of Genotypes for Yield and it's Contributing Traits in Garden Pea (*Pisum sativum* L.)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The experiment was conducted to find out the diversity 44 diverse genotypes during year 2019-20 for quantitative and qualitative traits. Wide range of variations was observed among the studied traits viz., days to 50 per cent flowering, primary branches per plant, node to first flower appears, node to first pod appears, length of pod (cm), pod diameter (cm), number of seed per pod, number of pod per plant, number of pod per 250g, number of seed per 250g, weight of seed per 250g, shelling(%), T.S.S.(^{0}B), pod yield per plant and two visual observation were pod shape and pod colour were recorded. Perusal of *per se* performance of the genotypes for all the traits studied

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revealed a wide range of mean values which indicated that the genotypes involved in this study were genetically diverse and have good breeding value, which confirmed the predictions of analysis of variance. Out of 44 genotypes, eighteen genotypes produced significantly higher yield than best check PC-521.

Keywords: Garden pea; mean perform; diversity; yield.

1. INTRODUCTION

"Garden Pea (*Pisum sativum* L. var. *hortense*) belongs to family Leguminaceae sub family Fabaceae and is an important legume vegetable grown throughout world during cool season. It is a self pollinated crop having diploid chromosome number 2n=14. It is most extensively cultivated in the temperate regions and restricted to cooler altitudes in the tropics and winter season in the sub tropics. It is highly nutritious and capable of using atmospheric nitrogen" [1]. "Green peas are low in saturated fat, cholesterol and salt. They are a good source of protein, vitamins and minerals including vitamin A, vitamins B6, folate and magnesium. They are also an excellent source of fibre, vitamin C, vitamin K, thiamine and manganese. The total area covered by peas is 563 million hectare with the production of 5703 metric tonnes whereas, productivity is 10.12metric tonnes per hectare" [2]. The major pea growing states in India are Uttar Pradesh, Bihar, Madhya Pradesh and Maharashtra. Uttar Pradesh is the leading producer of pea contributing alone about 50% of its production and area.

2. MATERIALS AND METHODS

The present investigation entitled **"**Evaluation of genotypes for yield and its contributing traits in Garden pea (*Pisum sativum* L.*)*" was carried out at Main Experiment Station (Vegetable Research Farm),Acharya Narendra Nagar (Kumarganj), Ayodhya, U.P., India, during Rabi season of 2019-20. The experimental materials for the present investigation was comprised of 44 different genotype(42 genotype + 2 check) of garden pea selected on the basis of genetic variability from the germplasm stock maintained in the Department of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, U.P., India. These 44 genotypes were evaluated for the study of evaluation genotypes. "The experiment laid out in Randomized Block Design with three replication and 44 treatment including two check. The observations viz. Days requiredfor 50 per cent flowering, primary branches per plant, node to first flower appears, node to first pod appears, length of pod (cm), pod diameter (cm), number of seed per pod, number of pod per plant, number of pod per 250g, number of seed per 250g, weight of seed per 250g, shelling(%), T.S.S.(^{0}B), pod yield per plant, pod shape and pod colour were recorded" [1].

2.1 Statistical Analysis

The mean performance for the design of experiment was carried out according to the procedure outlined by Panse and Sukhatme [3].

3. RESULTS AND DISCUSSION

Perusal of *per se* performance of the genotypes for all the traits studied revealed a wide range of mean values which indicated that the genotypes involved in this study were genetically diverse and have good breeding value, which confirmed the predictions of analysis of variance. Among the genotypes, NDVP-132 was the earliest line with respect to days to 50% followed by NDVP-158; highest number of primary branches per plant 6.12 (NDVP-128); Node to first flower appears 8.66 (NDVP-127) ; Node to first pod appears 7.53 (NDVP-123); Length of Pod 10.37 cm(PC-521); Width of Pod (cm) 1.70 (NDVP-141); of Seeds per pod 8.20 seeds (NDVP-163); Number of Pods per plant 39.20 (NDVP-161); Number of Pods per plant 68.00 (NDVP-169); Number of seeds per 250 476.00 (NDVP-171); Weight of seeds per 250 160.00 (NDVP-127.00); shelling per cent 56.00%(NDVP-136); maximum T. S.S. 17.66 (NDVP-160) and maximum yield per plant 199.26 g(NDVP-168) during 2019-20. Among 44 genotype pod shape of thirty three genotype were curve shape, nine straight shape and two slightly curve shape. The pod colour among 44 genotype, twenty four genotype were light green and twenty dark green. Out of 44 genotypes, eighteen genotypes produced significantly higher yield than best check PC-521 (Table-1).The present study corroborated with the findings of Srivastava et al. [4]; Dar et al. [5]; Ghobary [6]; Luthra [7]; Raj et al. [8]; Pathak et al. [9]; Prasad et al.[10].

Table 1. Mean performance of genotypes in relation to different growth and yield traits of garden pea

Genotypes	Days to 50% Flowering	Primary branches per plant	Node to first flower appears	Node to first pod appears	Length of pod (cm)	Width of pod (cm)	Number of seed per pod	Number of pod per plant	Number of pod per 250 gm	Number of seed per 250 gm	Weight of seed per 250gm	Shelling %	T.S.S.(^{0}B)	Pod yield per plant (gm)
NDVP-121	43.66	3.86	9.86	10.06	8.87	1.35	7.40	26.66	45.00	347.66	153.33	50.33	11.83	156.20
NDVP-122	41.54	5.06	10.70	10.76	8.17	1.33	5.26	32.40	46.66	245.40	105.76	40.93	11.43	101.44
NDVP-123	43.76	3.53	9.86	9.26	8.17	1.39	5.66	21.63	45.00	270.70	146.66	52.00	11.00	115.87
NDVP-124	51.39	4.46	9.80	9.80	9.71	1.25	6.93	22.13	46.66	286.00	145.00	50.66	11.06	118.66
NDVP-125	46.95	3.40	9.46	10.06	9.20	1.56	5.33	15.80	37.33	221.66	113.33	45.33	12.66	111.73
NDVP-126	42.96	3.13	9.13	9.20	9.28	1.30	6.60	21.46	44.00	271.66	126.66	50.66	10.43	124.26
NDVP-127	42.66	3.53	8.66	8.73	8.03	1.39	6.86	18.26	46.00	310.66	160.00	54.00	10.73	112.26
NDVP-128	41.88	6.12	10.56	10.43	8.53	1.43	7.73	33.26	50.33	379.66	120.83	48.16	13.03	130.33
NDVP-129	41.54	3.50	9.46	10.13	8.25	1.38	5.93	20.20	46.00	250.66	133.33	53.33	14.26	115.33
NDVP-130	61.10	4.73	9.33	7.53	9.34	1.35	6.80	19.70	51.33	300.00	133.33	53.33	14.03	112.73
NDVP-131	42.07	4.60	9.26	9.26	9.90	1.29	7.06	25.87	43.33	264.00	145.00	51.33	14.30	133.82
NDVP-132	41.40	4.00	10.60	10.60	9.30	1.34	6.80	30.20	44.66	312.33	153.33	54.66	10.66	158.82
NDVP-133	44.81	3.96	12.26	12.40	8.68	1.42	6.00	24.50	48.00	256.33	140.00	51.33	14.13	172.54
NDVP-134	44.54	1.79	11.80	12.46	7.29	1.36	6.40	18.73	48.00	286.00	115.00	41.33	10.70	102.96
NDVP-135	44.41	2.40	9.86	10.40	8.06	1.40	6.80	33.71	43.00	280.00	140.00	50.66	13.16	178.66
NDVP-136	44.69	3.10	9.46	9.53	8.45	1.30	6.26	18.20	44.66	276.33	140.00	56.00	10.66	101.40
NDVP-137	47.07	3.83	12.80	13.80	9.65	1.55	6.20	22.33	49.33	287.00	133.33	53.33	10.60	111.13
NDVP-138	42.93	2.93	12.93	13.26	10.04	1.46	7.60	21.86	49.00	379.00	146.66	52.66	11.56	119.00
NDVP-139	43.88	3.83	12.40	12.93	9.54	1.42	7.73	20.36	66.33	374.33	146.66	51.33	12.50	92.86
NDVP-140	44.85	4.13	12.66	12.93	7.28	1.68	6.20	38.73	52.33	321.66	120.00	48.00	11.50	187.06
NDVP-141	42.97	2.86	14.66	14.66	8.41	1.70	7.20	22.00	43.00	313.33	143.33	52.66	13.93	178.60

Genotypes	Days to 50% Flowering	Primary branches per plant	Node to first flower appears	Node to first pod appears	Length of pod (cm)	Width of pod (cm)	Number of seed per pod	Number of pod per plant	Number of pod per 250 gm	Number of seed per 250 gm	Weight of seed per 250gm	Shelling %	T.S.S.(^{0}B)	Pod yield per plant (gm)
VRP-6 (C)	43.85	2.16	10.06	10.20	8.74	1.38	7.13	23.50	45.66	297.00	126.66	50.66	12.73	115.06
NDVP-151	53.45	3.00	13.80	13.86	9.30	1.49	6.53	31.06	43.66	300.00	146.66	50.66	12.46	163.93
NDVP-152	52.77	2.26	12.20	12.46	9.56	1.32	8.20	27.06	60.00	376.66	156.66	52.66	13.26	119.66
NDVP-153	45.31	4.05	13.40	13.60	9.78	1.43	7.93	36.93	48.66	369.33	143.33	50.66	11.63	193.06
NDVP-154	51.86	2.86	12.00	13.06	9.81	1.20	7.66	26.50	62.00	456.66	153.33	53.33	12.66	95.13
NDVP-155	49.06	2.33	11.60	12.40	9.58	1.16	7.33	36.30	56.33	421.33	153.33	52.66	11.23	151.13
NDVP-156	59.15	2.13	13.53	13.53	10.16	1.18	6.73	35.73	51.33	341.66	146.66	52.66	12.36	171.20
NDVP-157	53.05	1.83	12.93	13.53	9.81	1.14	7.93	25.86	57.33	464.33	153.33	52.00	13.30	109.46
NDVP-158	63.77	3.03	12.46	13.53	9.36	1.28	7.40	34.60	46.66	344.33	146.66	52.66	12.16	190.80
NDVP-159	55.42	2.90	14.06	14.20	10.19	1.36	7.80	35.60	46.00	342.00	133.33	53.33	15.30	198.86
NDVP-160	66.30	1.53	12.13	12.13	9.82	1.53	7.93	31.40	45.00	359.33	140.00	52.00	17.66	171.80
NDVP-161	60.63	3.86	13.46	15.00	10.16	1.01	7.66	39.20	61.33	443.33	136.66	50.66	12.00	160.60
NDVP-162	52.41	2.96	14.20	13.86	8.38	1.23	7.33	31.20	52.33	405.00	126.66	50.66	14.93	141.80
NDVP-163	56.54	2.73	10.60	13.00	9.97	1.10	8.20	26.06	51.66	431.66	150.00	52.66	14.13	126.20
NDVP-164	60.71	1.90	13.13	13.13	9.69	1.12	7.26	17.06	61.66	443.33	130.00	50.66	16.16	69.00
NDVP-165	67.02	1.80	11.40	11.40	7.80	1.28	6.53	27.66	67.66	425.00	140.00	52.00	12.50	95.13
NDVP-166	67.36	2.90	15.53	14.80	8.07	1.28	6.73	39.20	59.33	405.00	133.33	53.33	13.66	196.40
NDVP-167	63.23	1.86	18.40	18.53	7.55	1.19	7.20	38.93	74.00	474.33	136.66	54.66	11.06	146.93
NDVP-168	61.27	4.03	16.73	16.86	8.88	1.61	6.46	34.60	41.66	259.33	133.33	53.33	12.23	199.26
NDVP-169	52.89	2.53	12.53	12.86	9.22	1.10	6.20	31.73	68.00	406.66	126.66	46.66	14.06	116.13
NDVP-170	53.32	2.26	15.06	15.06	8.43	1.22	6.46	34.26	61.00	359.33	130.00	50.00	12.23	134.93
NDVP-171	54.95	2.86	14.60	14.60	9.56	1.16	7.66	25.10	64.00	476.00	143.33	52.66	12.33	98.01
PC-521 (C)	57.27	2.86	12.53	14.33	10.37	1.14	7.26	30.26	50.66	422.00	146.66	52.00	9.50	139.00
SE(d)	1.51	0.16	0.69	0.69	0.28	0.04	0.37	1.25	1.94	10.44	6.58	1.73	0.28	4.61
CV	5.13	8.85	9.96	9.76	5.37	6.21	9.30	7.77	6.52	5.21	8.23	5.88	3.87	5.82
CD @ 1 %	5.63	0.60	2.59	2.59	1.04	0.17	1.39	4.66	7.22	38.92	24.53	6.48	1.04	17.20
CD @ 5 %	4.25	0.45	1.95	1.96	0.78	0.13	1.05	3.52	5.45	29.37	18.51	4.89	0.79	12.98

, Significant at 5% & 1% respectively*

4. CONCLUSION

It can be concluded that among the 44 genotypes, only eighteen genotypes NDVP-168 followed by NDVP-159, NDVP-166, NDVP-153, NDVP-121, NDVP-132, NDVP-133, NDVP-135, NDVP-140, NDVP-151, NDVP-155, NDVP-156, NDVP-158, NDVP-160, NDVP-161, NDVP-162, NDVP-166, and NDVP-167 were found as significant and most promising genotypes for pod yield per plant along with some other traits higher yield than check PC-521. Performance of the genotypes for all the traits studied revealed a wide range of mean values which indicated that the genotypes involved in this study were genetically diverse and have good breeding value. These genotypes can be used for future breeding programmes to developed high yielding varieties and benefit to farmers.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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