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Short communication

Genetic analysis in Indian bean germplasm under Tripura agro-climatic conditions

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The Indian bean (*Dolichos purpureas* (L.) Sweet) is a popular leguminous vegetable grown in Tripura, a state in north eastern India. It is a self-pollinated crop but cross pollination (25-30%) has also been reported. Hence, there is a wide range of variation which aid in the selection of superior desirable land races (or) local varieties. Due to cross pollination and sexual propagation over long period of time, there is high degree of genetic diversity with in the species. The yield improvement in Indian bean can be achieved through selection of superior genotypes with desirable traits combination existing in nature. Hence, an attempt has been made to collect the available germplasm and evaluate them for yield and other genetic parameters.

The experimental material for the present investigation comprised of 31 local germplasm collected from west and south Tripura. These were evaluated in randomized block design with three replication for the two consecutive years (2005 & 2006) at the Experimental Farm of ICAR Research Complex for NEH Region, Tripura Centre, Lembucherra, West Tripura. The seeds were sown in pits (30 cm^3) at a distance of 2.5 m x 2.5 m (row to row and plant to plant) during the third week of June during each year. The standard package practices were followed as per recommendation (1). The observations were recorded on three randomly taken competitive plants for nine (9) quantitative characters *viz*., No. of flowers/spike, No. of fruits/ spike, No. of spikes/hill, fruit length, fruit breadth, pericarp thickness, seed number, pod weight and yield/hill were recorded. The pooled data were statistically analysed as per the standard procedure for variability (Panse and Shukhatme, 3).

The thirty one genotypes involved in the study varied significantly among themselves for all the horticultural traits studied, as revealed by the analysis of variance over the years (Table 1). The highest No. of flowers/spike (45.67) was recorded in TRC-D1 followed by 42.33 in TRC-D18. Similarly, the highest No. of fruits/spike (18.66) was noticed in TRC-D9 followed by 17.33 fruits/spike in TRC-D1. The maximum No. of spikes/ hill (115.33) was recorded in TRC-D24 followed by 111.66 in TRC-D5 and minimum No. of spikes/plant (18.66) was recorded in TRC-D7. The pod length and pod breadth was highest in TRC-D20 with 18.50 and 3.03 cm, respectively. The lowest pod length (6.73 cm) and pericarp thickness was recorded (0.13 cm) in TRC-D7 and TRC-D14 and TRC-D19, respectively. There was no significant difference in pericarp thickness among the germplasm tested.

The highest pod yield per hill was recorded in TRC-D1 (10.33 kg) followed by 10.13 kg in TRC-D9 and least pod yield (1.42 kg) was recorded in TRC-D8. Similar pattern of variability in germplasm evaluation of mung bean was reported by Sharma (4). The phenotypic and genotypic coefficient of variability is presented in Table 2. It reveals that there is a close proximity between phenotypic and genotypic coefficients of variability, which indicates the less influence of environment in the expression of quantitative traits in the study. The highest phenotypic coefficient of variability was observed for pod breadth. However, a maximum phenotypic and genotypic coefficient of variability was recorded in, no.of fruit/ spike, pod weight and yield/ hill. This result is in corroboration with the result reported by Gunasekaran *et al.* (3). This indicated better scope of phenotypic selection through this trait for improvement in Indian bean. The high heritability was noticed for pod length and pod weight; where as high estimate of genetic advance was observed for pod length and yield/ hill. This inferred that simple selection among different local varieties for these traits could bring about significant improvement in Indian bean. Thus, the characters like No. of fruits/spike; pod length, pericarp thickness, pod weight and yield/hill need to be well considered as selection criteria for yield improvement programme. The local varieties (or) genotypes such as TRC-D1, TRC-D2, TRC-D3, TRC-D5, TRC-D9 and TRC-D12 can be recommended for commercial cultivation in North Eastern states, particularly in Tripura and these materials can be utilized in future breeding programmes for developing superior high yielding varieties.

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Table 1. Mean performance of different traits in some Indian bean genotype.

Genotype	No. of flowers/ spike	No. of fruits/ spike	No. of spikes/ hill	Pod length (cm)	Pericarp thickness (cm)	Pod breadth (cm)	No. of seeds/ pod	Pod weight (g)	Yield/ hill (kg)
TRC- D1	45.67	17.33	105.33	10.66	0.26	1.66	4.66	6.20	10.33
TRC-D2	35.33	16.33	96.33	10.93	0.15	2.20	4.66	7.55	9.46
TRC-D3	32.33	16.66	81.33	14.66	0.18	2.30	5.66	5.96	10.10
TRC-D4	32.33	11.66	107.33	15.16	0.15	2.16	5.66	9.30	8.10
TRC-D5	33.67	13.00	111.66	6.73	0.26	2.53	4.66	6.26	9.03
TRC-D6	33.00	13.33	20.66	8.00	0.17	2.56	4.33	4.45	8.23
TRC-D7	24.66	9.00	18.66	6.73	0.20	2.13	5.33	5.93	2.30
TRC-D8	27.33	12.66	111.33	8.00	0.16	1.86	4.00	4.73	1.42
TRC-D9	37.66	18.66	99.66	8.83	0.11	2.10	5.33	6.58	10.12
TRC-D10	39.33	11.00	67.33	8.83	0.11	2.06	5.33	6.66	4.36
TRC-D11	32.33	9.66	85.66	14.00	0.18	2.56	4.33	9.70	6.80
TRC-D12	37.33	11.66	112.00	14.33	0.15	2.60	4.33	10.20	10.03
TRC-D13	25.66	8.66	98.00	13.66	0.15	2.33	4.66	6.06	5.23
TRC-D14	29.33	8.33	84.33	13.66	0.13	1.76	4.33	9.06	6.40
TRC-D15	35.33	9.33	83.66	12.16	0.18	1.80	3.66	7.63	5.98
TRC-D16	39.66	13.66	93.33	11.03	0.18	1.80	4.33	7.80	8.10
TRC-D17	28.66	7.66	110.33	10.06	0.11	1.76	4.66	5.93	7.53
TRC-D18	42.00	16.66	84.33	11.40	0.11	1.43	5.33	7.53	7.40
TRC-D19	23.66	8.00	107.33	10.06	0.13	1.63	4.66	4.83	8.76
TRC-D20	32.00	9.00	110.00	18.50	0.16	3.03	3.66	12.76	5.05
TRC-D21	29.33	9.33	88.66	7.66	0.38	2.23	5.66	5.46	5.02
TRC-D22	23.33	5.66	110.00	8.00	0.66	1.76	3.33	5.01	5.02
TRC-D23	28.67	9.00	86.66	9.13	0.20	2.40	3.66	8.52	5.93
TRC-D24	28.66	8.33	115.33	6.96	0.19	2.10	3.66	4.44	4.28
TRC-D25	33.66	9.00	109.67	8.36	0.18	2.26	4.00	5.30	5.37
TRC-D26	27.66	9.33	92.00	8.96	0.20	2.20	5.00	6.77	6.31
TRC-D27	31.33	10.66	104.66	7.23	0.18	2.70	4.66	5.97	5.33
TRC-D28	29.33	6.33	74.66	9.13	0.19	2.56	4.00	8.16	8.72
TRC-D29	33.00	9.00	105.33	10.60	0.14	1.93	4.66	5.73	3.20
TRC-D30	29.33	8.66	90.33	8.13	0.14	2.20	4.33	8.63	5.20
TRC-D31	31.33	11.00	90.00	8.16	0.17	2.06	5.33	6.80	5.80
CD at 5%	8.77	4.53	14.78	1.52	NS	0.50	1.4	0.91	1.62

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Table 2. Coefficients of variability, heritability and genetic advance for different traits in Indian bean genotypes.

Trait	Mean	Range	CV	GCV (%)	PCV (%)	h^2	Genetic Advance as % of mean
No. of flowers/spike	31.98±3.10	23.33-45.67	16.80	13.05	21.27	0.37	16.49
No. of fruits/spike	10.92±1.60	6.33-18.66	25.43	26.95	37.05	0.52	40.38
No. of spikes/hill	92.19±5.22	18.66-115.33	9.81	24.27	26.18	0.85	46.36
Pod length (cm)	10.31±0.53	6.73-18.50	9.02	28.00	29.42	0.90	54.90
Pericarp thickness (cm)	0.19±0.09	0.11-0.38	82.90	22.05	85.79	0.06	11.67
Pod breadth (cm)	2.15±0.13	1.66-3.03	10.73	15.65	18.98	0.68	26.60
No. of seeds pod	4.58±0.38	3.33-5.66	14.68	11.52	18.66	0.38	14.64
Pod wt. (g)	6.96±0.32	4.44-12.70	8.07	26.93	28.12	0.91	53.14
Yield/hill (kg)	6.61±0.43	1.42-10.33	11.36	34.91	36.72	0.90	68.39

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