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Correlation for Growth, Quality, Yield and Yield Components in Yardlong Bean (*Vigna unguiculata* (L.) walp. ssp. *Sesquipedalis* verdc.)

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A B S T R A C T

The present investigation was conducted on yardlong bean to identify the characters which mainly contribute to the pod yield. Twenty four genotypes of yardlong bean were evaluated during *kharif*, 2017 and observations recorded on growth, pod yield and quality parameters. Correlation studies revealed that pod yield per plant (g) had significant and positive association with traits like vine length (0.424 P, 0.521 G), number of primary branches per plant (0.862 P, 0.977 G), number of nodes per plant (0.390 P, 0.442 G), days to first flowering (0.182 P, 0.236 G), length of harvesting period (0.584 P, 0.915 G), pod length (0.743 P, 0.801 G), pod girth (0.887 P, 1.013 G), number of clusters per plant (0.902 P, 1.033 G), length of cluster stalk (0.722 P, 1.059 G), number of pods per cluster (0.843 P, 1.026 G), number of pods per plant (0.840 P, 1.094 G), seed number per pod (0.153 P, 0.250 G) and 100 seed weight (0.583 P, 0.658 G) at phenotypic and genotypic levels respectively.

Introduction

Yardlong bean (*Vigna unguiculata* (L.) walp. ssp. *sesquipedalis* verdc. 2n=22) belonging to family leguminaceae is cultivated mainly for its crisp and tender green pods which are consumed both fresh as well as in cooked form.

It is also called as asparagus bean, Chinese long bean, pea bean, string bean, snake bean, snake pea, snap pea, bodi and borboti. Yardlong beans, as the name suggests, differ from cowpea in their very slender long green beans, which have a beautiful delicate flavour. This legume is also known as poor man's meat as it is a rich and inexpensive source of vegetable protein along with vitamin A, thiamin, riboflavin, calcium, phosphorus, sodium, potassium, magnesium, vitamin C and micronutrients like iron, zinc, manganese and cobalt (Ano and Ubochi, 2008).

Yield is a complex character and is function of components of large number of contributing characters and their interactions.

A study of correlation between different quantitative characters provides an idea of association and it could be effectively exploited to formulate selection strategies for improving growth, yield and quality.

Materials and Methods

The present investigation entitled "Studies on genetic variability in yardlong bean (*Vigna unguiculata* (L.) walp. ssp. *sesquipedalis* verdc.) was conducted during *kharif*, 2017-18 at College of Horticulture, Venkataramannagudem. Twenty four genotypes of yardlong bean collected from various places were sown in Randomized Block Design with 3 replications. Each genotype of a replication consists of eight plants, sown in two rows with a spacing of 2m between the rows and 1m between the plants.

All the package of practices was followed as per the recommendation.

Data pertaining to the characters such as vine length (cm), number of primary branches per plant, number of nodes per plant, terminal leaf breadth (cm), terminal leaf length (cm), days to first flowering, days to 50% flowering, days to first harvest, length of harvesting period, pod length (cm), pod girth (mm), number of clusters per plant, length of cluster stalk, number of pods per cluster, number of pods per plant, seed number per pod, ascorbic acid content (mg/100g), TSS (°Brix), protein content (mg/100g), titrable acidity (%), 100 seed weight, pod yield per plant (kg), pod yield per plot (kg) and pod yield per hectare (tonnes) were collected from 5 randomly selected plants from each plot in each replication and subjected to statistical analysis.

Phenotypic and genotypic correlation coefficients between different variables were calculated by using covariance technique (Al-Jibouri *et al.,* 1958).

Results and Discussion

The association of pod yield with other characters was estimated by genotypic and phenotypic correlation coefficient (Table 1).

Pod yield per plant (g) showed positive and significant correlation with traits like vine length (0.424 P, 0.521 G), number of primary branches per plant (0.862 P, 0.977 G), number of nodes per plant (0.390 P, 0.442 G), days to first flowering (0.182 P, 0.236 G), length of harvesting period (0.584 P, 0.915 G), pod length (0.743 P, 0.801 G), pod girth (0.887 P, 1.013 G), number of clusters per plant (0.902 P, 1.033 G), length of cluster stalk (0.722 P, 1.059 G), number of pods per cluster (0.843 P, 1.026 G), number of pods per plant (0.840 P, 1.094 G), seed number per pod (0.153 P, 0.250 G) and 100 seed weight (0.583 P, 0.658 G) at phenotypic and genotypic levels respectively.

This trait had negative significant correlation with days to first harvest (-0.106 P, -0.292 G) at phenotypic and genotypic levels. These results are in consonance with the findings of Venkatesan *et al.,* (2003) in cowpea, Chauhan *et al.,* (2007) in Urd bean, Mishra *et al.,* (2008) in French bean, Katiyar and Dixit (2009) in field pea, Rai *et al.,* (2009) in Indian bean and Devendra and Nandan (2010) in dolichos bean.

In conclusion, the relationship between yield and yield contributing characters in different genotypes of yardlong bean through phenotypic and genotypic correlations suggests that number of pods per plant and cluster stalk length (cm) were the most important characters as they exhibited high correlation coefficient on pod yield per plant (g).

Therefore, selection for these characters would give better response.

Table.1 Phenotypic (P) and genotypic (G) correlation coefficients among yield and yield attributes in twenty four genotypes of yardlong bean

characters		VL	PB	TLB	TLL	NN	DFF	D50	DFH	LHP	PL	PG	NCP	CSL	NPC	NPP	NSP	AAC	TSS	PC	TA	SW	PYP
VL	P	**1.000**	0.333**	0.345**	0.443**	0.719**	0.133	0.065	-0.150	-0.074	0.416**	0.450**	0.449**	0.246*	0.472**	0.409**	0.162	0.177	-0.097	0.089	-0.114	0.492**	0.424**
	G	**1.000**	0.364**	0.444**	0.631**	0.944**	0.200	0.122	-0.233*	-0.141	0.469**	0.518**	0.490**	0.489**	0.521**	0.508**	0.156	0.194	-0.093	0.103	-0.176	0.551**	0.521**
PB	P		**1.000**	-0.039	0.079	0.232*	0.088	0.023	-0.208	0.634**	0.620**	0.837**	0.887**	0.701**	0.782**	0.808**	0.219	0.019	0.148	-0.024	0.091	0.488**	0.862**
	G		**1.000**	-0.021	0.209	0.309**	0.188	0.079	-0.251*	0.973**	0.667**	0.938**	0.983**	1.021**	0.920**	1.044**	0.434**	0.016	0.172	-0.039	0.132	0.514**	0.977**
TLB	P			**1.000**	0.806**	0.441**	0.214	0.249*	0.112	-0.216	0.106	-0.019	-0.019	-0.016	-0.043	0.029	-0.005	0.178	-0.035	0.037	0.052	0.041	-0.027
	G			**1.000**	0.896**	0.596**	0.318**	0.384**	0.158	-0.374**	0.116	-0.074	-0.006	0.084	-0.043	-0.074	0.148	0.212	0.054	0.035	0.006	0.025	-0.020
TLL	P				**1.000**	0.417**	0.215	0.201	0.084	-0.112	0.097	0.175	0.134	0.033	0.135	0.156	0.254*	0.112	0.050	0.073	0.020	0.086	0.090
	G				**1.000**	0.774**	0.269*	0.281*	0.163	-0.277*	0.163	0.181	0.190	0.292*	0.198	0.155	0.517**	0.179	0.077	0.101	-0.082	0.134	0.176
NN	P					**1.000**	0.107	0.048	-0.162	-0.136	0.438**	0.385**	0.354**	0.282*	0.363**	0.330**	0.061	0.393**	-0.085	0.121	-0.062	0.461**	0.390**
	G					**1.000**	0.121	0.023	-0.379**	-0.141	0.520**	0.462**	0.432**	0.383**	0.485**	0.448**	0.209	0.448**	-0.020	0.139	-0.120	0.588**	0.442**
DFF	P						**1.000**	0.945	0.744**	-0.049	0.155	0.177	0.179	0.093	0.123	0.181	-0.080	0.214	-0.084	-0.278*	0.066	0.155	0.182
	G						**1.000**	0.964	0.768**	0.037	0.202	0.266*	0.233*	0.343	0.295*	0.221	-0.456**	0.299*	-0.221	-0.447**	-0.003	0.208	0.236*
D50	P							**1.000**	0.776**	-0.081	0.076	0.076	0.085	0.056	-0.005	0.102	-0.089	0.197	-0.086	-0.296*	0.116	0.098	0.078
	G							**1.000**	0.827**	-0.060	0.083	0.095	0.118	0.262*	0.126	0.068	-0.425**	0.287*	-0.248*	-0.492**	0.057	0.140	0.081
DFH	P								**1.000**	-0.114	-0.066	-0.124	-0.146	-0.156	-0.216	-0.095	-0.029	0.098	-0.040	-0.313**	-0.049	-0.116	-0.106
	G								**1.000**	-0.145	-0.157	-0.212	-0.228	-0.126	-0.216	-0.303**	-0.411**	0.104	-0.167	-0.535**	-0.120	-0.163	-0.291
LHP	P									**1.000**	0.432**	0.576**	0.604**	0.451**	0.658**	0.607**	-0.036	-0.042	0.108	-0.004	0.151	0.198	0.584**
	G									**1.000**	0.599**	0.872**	0.912**	1.062**	0.752**	0.936**	0.331**	-0.062	0.365**	0.003	0.045	0.316**	0.915**
PL	P										**1.000**	0.682**	0.727**	0.543**	0.662**	0.679**	-0.098	0.389**	-0.002	0.072	-0.006	0.716**	0.743**
	G										**1.000**	0.770**	0.795**	0.859**	0.737**	0.816**	-0.084	0.402**	-0.003	0.082	-0.032	0.751**	0.801**
PG	P											**1.000**	0.901**	0.633**	0.868**	0.816**	0.157	0.221	0.098	0.059	-0.061	0.539**	0.887**
	G											**1.000**	1.000**	1.099**	1.018**	1.080**	0.297*	0.215	0.170	0.054	-0.018	0.621**	1.013**
NCP	P												**1.000**	0.722**	0.885**	0.796**	0.182	0.176	0.095	0.023	0.025	0.597**	0.902**
	G												**1.000**	1.073**	0.972**	1.129**	0.308**	0.190	0.115	0.037	0.067	0.678**	1.033**
CSL	P													**1.000**	0.606**	0.598**	0.070	0.185	0.119	0.061	-0.015	0.414**	0.722**
	G													**1.000**	1.091**	1.199**	0.478**	0.259*	0.093	0.121	0.007	0.694**	1.059**

characters		VL	PB	TLB	TLL	NN	DFF	D50	DFH	LHP	PL	PG	NCP	CSL	**NPC**	NPP	NSP	AAC	TSS	PC	TA	SW	PYP
NPC	P														**1.000**	0.788**	0.105	0.110	0.081	0.101	0.002	0.554**	0.843**
	G														**1.000**	1.083**	0.305**	0.125	0.205	0.127	-0.072	0.634**	1.026**
NPP	P															**1.000**	0.118	0.150	0.040	0.033	0.020	0.564**	0.840**
	G															**1.000**	0.382**	0.155	0.197	0.060	0.035	0.678**	1.094**
NSP	P																**1.000**	-0.063	0.268*	0.206	-0.086	0.071	0.153
	G																**1.000**	-0.135	0.278*	0.249*	-0.181	0.214	0.250*
AAC	P																	**1.000**	-0.381**	0.140	0.135	0.493**	0.176
	G																	**1.000**	-0.467**	0.134	0.165	0.525**	0.185
TSS	P																		**1.000**	-0.041	-0.039	-0.173	0.098
	G																		**1.000**	-0.048	-0.171	-0.224	0.117
PC	P																			**1.000**	0.064	0.255*	0.046
	G																			**1.000**	0.078	0.283*	0.040
TA	P																				**1.000**	0.129	0.003
	G																				**1.000**	0.156	0.064
100S	P																					**1.000**	0.583**
	G																					**1.000**	0.658**
PYP	P	0.424**	0.862**	-0.027	0.090	0.390**	0.182	0.078	-0.106	0.584**	0.743**	0.887**	0.902**	0.722**	0.843**	0.840**	0.153	0.176	0.098	0.046	0.003	0.583**	**1.000**
	G	0.521**	0.977**	-0.020	0.176	0.442**	0.236*	0.081	-0.291	0.915**	0.801**	1.013**	1.033**	1.059**	1.026**	1.094**	0.250*	0.185	0.117	0.040	0.064	0.658**	**1.000**

***significant at 5% LOS ** significant at 1 % LOS**

VL= Vine Length (cm) ; NPB= Number of Primary branches ; TLL= Leaf length (cm) ; TLB= Leaf breadth (cm) ; NN= Number of nodes per plant ; DF= Days to first flowering ; DFF = Days to 50% flowering ; DFH=Days to first harvesting ; LHP=Length of harvesting period (days**)** ; PL= Pod length ; PG= Pod girth ; NCP= No. of clusters per plant ; CSL= Cluster stalk length (cm) ; NPC= No. of pods per cluster ; NPP= Number of pods per plant ; SNP= Seed number per pod ; AA=Ascorbic acid content (mg/100g) ; TSS=Total soluble solids ; PC=Protein content; TA=Titrable acidity ; SW= Seed weight; PYP= Pod yield per plant

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