



## Character Association and Path Coefficient Analyses for Yield and Component Traits in Castor (*Ricinus communis* L.)

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### ABSTRACT

Correlation and path coefficient analyses were carried out with fifty four genotypes of castor for yield and component traits. The character association studies revealed that total length of primary raceme, effective length of primary raceme, total length of secondary raceme, effective length of secondary raceme, tertiary branches plant<sup>-1</sup>, nodes to tertiary raceme, stem length to tertiary raceme, effective length of tertiary raceme, 100 seed weight of primary raceme, 100 seed weight of secondary raceme, 100 seed weight of tertiary raceme, oil content, harvest index, seed yield plant<sup>-1</sup> at 120 days and seed yield plant<sup>-1</sup> upto 150 days showed significant positive association with seed yield plant<sup>-1</sup> upto 180 days at both genotypic and phenotypic levels. Path coefficient analysis revealed that harvest index, seed yield plant<sup>-1</sup> upto 150 days, tertiary branches plant<sup>-1</sup> and 100 seed weight of primary raceme exerted highest direct effect on seed yield plant<sup>-1</sup> upto 180 days.

**Key words :** Castor, Character Association, Path analysis

Castor is one of the important non-edible oilseed crops of India cultivated in 8.64 lakh ha with a total production of 9.90 lakh tonnes and an average productivity of 1146 kg ha<sup>-1</sup> (Damodaram and Hedge, 2007). Both correlation and path coefficient analysis form a basis for selection and also help in understanding those yield components affecting yield improvement (Lakshamma *et al.*, 2005).

### MATERIAL AND METHODS

The present study was carried out with 54 genotypes of castor (*Ricinus communis* L.), in randomized block design with two replications at Agricultural College Farm, Bapatla during kharif 2008-09. The inter- and intra-row spacing adapted was 90cm x 60cm. Each genotype was sown in 3 rows of 3m length and observations were recorded on ten plants from each genotype per replication for characters *viz.*, days to 50% flowering of primary raceme, stem length to primary raceme, number of nodes to primary raceme, total length of primary raceme, effective length of primary raceme, days to 80% maturity of primary raceme, secondary branches plant<sup>-1</sup>, days to 50% flowering of secondary raceme, number of nodes to secondary raceme, stem length to secondary raceme, total length of secondary raceme, effective length of secondary raceme, days to 80% maturity of secondary raceme, number of tertiary branches plant<sup>-1</sup>, days to 50% flowering of tertiary raceme, number of nodes to tertiary raceme, stem length to tertiary raceme, effective length of tertiary raceme, days to 80% maturity of tertiary raceme, 100 seed weight of

primary raceme, 100 seed weight of secondary raceme, 100 seed weight of tertiary raceme, oil content, L/B ratio of seed, harvest index, seed yield plant<sup>-1</sup> at 120 days, seed yield plant<sup>-1</sup> upto 150 days and seed yield plant<sup>-1</sup> upto 180 days. The data were statistically analyzed to estimate genotypic and phenotypic correlation coefficients and path coefficient analysis following Falconer (1964) and Dewey and Lu (1959).

### RESULTS AND DISCUSSION

Genotypic correlation coefficients in general were higher than phenotypic correlation coefficients (Table 1). Total length of primary raceme, effective length of primary raceme, total length of secondary raceme, effective length of secondary raceme, tertiary branches plant<sup>-1</sup>, nodes to tertiary raceme, stem length to tertiary raceme, effective length of tertiary raceme, 100 seed weight of primary raceme, 100 seed weight of secondary raceme, 100 seed weight of tertiary raceme, oil content, harvest index, seed yield plant<sup>-1</sup> at 120 days and seed yield plant<sup>-1</sup> upto 150 days showed significant positive association with seed yield plant<sup>-1</sup> upto 180 days at both genotypic and phenotypic levels. These results are in broad agreement with Giriraj *et al.*, 1973, Mehta and Vashi (1998) and Ramesh and Durga Prasad, 2001. Earliness is most desirable one in castor and the components of earliness in castor like days to 50 % flowering of primary raceme, days to 80% maturity of primary raceme, days to 50% flowering of secondary raceme, days to 80% maturity of secondary raceme, days to 50%

Table 1. Phenotypic (above diagonal) and genotypic (below diagonal) correlations for 28 characters in 54 castor (*Ricinus communis* L.) genotypes

S.No	character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Days to 50% flowering of primary raceme	1.00	0.76**	0.89**	0.25**	0.27**	0.85**	0.09	0.89**	0.34**	0.47**	0.04	0.06	0.86**	-0.05
2	Stem length to primary raceme	0.77**	1.00	0.75**	0.28**	0.28**	0.75**	-0.04	0.80**	0.31**	0.46**	0.03	0.03	0.75**	0.00
3	Nodes to primary raceme	0.90**	0.76**	1.00	0.14	0.11	0.79**	0.17	0.81**	0.33**	0.40**	-0.05	-0.06	0.78**	-0.12
4	Total length of primary raceme	0.26**	0.29**	0.14	1.00	0.90**	0.34**	-0.06	0.42**	0.34**	0.36**	0.57**	0.51**	0.40**	-0.27**
5	Effective length of primary raceme	0.27**	0.29**	0.12	0.92**	1.00	0.33**	-0.11	0.44**	0.30**	0.37**	0.58**	0.56**	0.39**	-0.31**
6	Days to 80% maturity of primary raceme	0.85**	0.76**	0.81**	0.35**	0.33**	1.00	-0.02	0.89**	0.41**	0.44**	0.10	0.10	0.90**	-0.07
7	Secondary branches plant <sup>1</sup>	0.09	-0.03	0.20*	-0.09	-0.14	-0.01	1.00	0.03	0.17	0.20*	-0.06	-0.10	0.06	0.10
8	Days to 50% flowering of secondary raceme	0.90**	0.81**	0.82**	0.43**	0.45**	0.90**	0.03	1.00	0.52**	0.51**	0.20*	0.20*	0.92**	-0.16
9	Nodes to secondary raceme	0.37**	0.34**	0.35**	0.37**	0.30**	0.44**	0.15	0.55**	1.00	0.34**	0.15	0.11	0.46**	-0.18*
10	Stem length to secondary raceme	0.49**	0.47**	0.41**	0.37**	0.39**	0.45**	0.23*	0.52**	0.36**	1.00	0.21*	0.25**	0.54**	-0.20*
11	Total length of secondary raceme	0.04	0.03	-0.05	0.58**	0.59**	0.11	-0.06	0.21*	0.16	0.22*	1.00	0.92**	0.19*	-0.19*
12	Effective length secondary raceme	0.06	0.04	-0.06	0.52**	0.58**	0.10	-0.12	0.21*	0.12	0.26**	0.94**	1.00	0.18*	-0.24**
13	Days to 80% maturity of secondary raceme	0.87**	0.76**	0.80**	0.41**	0.40**	0.91**	0.07	0.93**	0.49**	0.56**	0.19*	0.18*	1.00	-0.21*
14	Tertiary branches plant <sup>1</sup>	-0.05	0.00	-0.12	-0.28**	-0.32**	-0.07	0.11	-0.17	-0.19	-0.21*	-0.21*	-0.25**	-0.22*	1.00
15	Days to 50% flowering of tertiary raceme	0.85**	0.74**	0.78**	0.41**	0.43**	0.82**	0.15	0.94**	0.51**	0.53**	0.15	0.14	0.88**	-0.23*
16	Nodes to tertiary racemes	-0.31**	-0.32**	-0.33**	-0.15	-0.06	-0.28**	0.18*	-0.36**	-0.24**	-0.25**	0.02	-0.03	-0.31**	0.42**
17	Stem length to tertiary raceme	-0.29**	-0.20*	-0.38**	0.10	0.15	-0.33**	-0.23*	-0.28**	-0.29**	-0.26**	0.17	0.14	-0.31**	0.17
18	Effective length of tertiary raceme	-0.03	0.06	-0.08	0.43**	0.29**	-0.01	-0.11	0.12	0.19	-0.01	0.59**	0.53**	0.09	-0.01
19	Days to 80% maturity of tertiary raceme	0.79**	0.71**	0.70**	0.47**	0.47**	0.80**	-0.03	0.88**	0.44**	0.54**	0.19*	0.22*	0.89**	-0.34**
20	100 Seed weight of primary raceme	-0.19	-0.15	-0.13	0.30**	0.33**	-0.08	-0.16	-0.05	0.17	-0.29**	0.18*	0.16	-0.19*	-0.05
21	100 Seed weight of secondary raceme	0.02	0.06	0.08	0.26**	0.31**	0.00	-0.18*	0.09	0.22*	-0.26**	0.17	0.08	-0.08	0.08
22	100 Seed weight of tertiary raceme	-0.26**	-0.22*	-0.21*	0.07	0.14	-0.18*	-0.12	-0.17	0.12	-0.44**	0.01	-0.04	-0.32**	0.21*
23	Oil content (%)	-0.08	-0.06	-0.08	0.33**	0.37**	-0.03	-0.17	-0.02	0.12	-0.17	0.07	0.06	-0.09	-0.07
24	L/B ratio of seed	-0.36**	-0.11	-0.30**	-0.02	0.00	-0.30**	-0.10	-0.30**	-0.23*	-0.13**	0.00	-0.06	-0.22*	-0.14
25	Harvest index (%)	-0.62**	-0.63**	-0.60**	0.11	0.00	-0.60**	-0.01	-0.55**	-0.16	-0.52**	0.26**	0.15	-0.58**	0.04
26	Seed Yield plant <sup>1</sup> at 120 days	-0.77**	-0.56**	-0.66**	-0.14	-0.13	-0.78**	-0.17	-0.75**	-0.31**	-0.41**	-0.02	-0.09	-0.84**	0.14
27	Seed yield plant <sup>1</sup> at 150 days	-0.78**	-0.60**	-0.73**	0.02	-0.02	-0.78**	-0.14	-0.73**	-0.31**	-0.49**	0.21*	0.12	-0.77**	0.13
28	Correlation with seed yield plant <sup>1</sup> at 180 days	-0.37**	-0.26**	-0.36**	0.30**	0.24**	-0.40**	0.04	-0.30**	-0.04	-0.30**	0.37**	0.27**	-0.35**	0.20*

Table 1 contd. Phenotypic (above diagonal) and genotypic (below diagonal) correlations for 28 characters in 54 castor (*Ricinus communis* L.) genotypes

S.No	character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Days to 50% flowering of primary raceme	0.84**	-0.29**	-0.29**	-0.03	0.77**	-0.18*	0.01	-0.24**	-0.07	-0.34**	-0.57**	-0.76**	-0.77**	-0.36**
2	Stem length to primary raceme	0.74**	-0.30**	-0.19*	0.06	0.70**	-0.14	0.05	-0.20*	-0.05	-0.10	-0.59**	-0.55**	-0.58**	-0.25**
3	Nodes to primary raceme	0.77**	-0.31**	-0.37**	-0.08	0.68**	-0.12	0.07	-0.20*	-0.07	-0.28**	-0.55**	-0.64**	-0.71**	-0.35**
4	Total length of primary raceme	0.40**	-0.14	0.09	0.41**	0.45**	0.30**	0.25**	0.07	0.28**	-0.01	0.10	-0.13	0.03	0.29**
5	Effective length of primary raceme	0.42**	-0.06	0.14	0.28**	0.46**	0.32**	0.30**	0.14	0.31**	0.00	0.01	-0.13	-0.02	0.22**
6	Days to 80% maturity of primary raceme	0.82**	-0.26**	-0.32**	0.00	0.79**	-0.07	0.00	0.17	-0.02	-0.28**	-0.56**	-0.76**	-0.76**	-0.37**
7	Secondary branches plant <sup>-1</sup>	0.14	0.17	-0.20*	-0.10	-0.02	-0.15	-0.15	-0.12	-0.11	-0.05	-0.02	-0.13	-0.11	0.03
8	Days to 50% flowering of secondary raceme	0.94**	-0.34**	-0.28**	0.11	0.86**	-0.05	0.09	-0.16	-0.02	-0.27**	-0.52**	-0.74**	-0.71**	-0.28**
9	Nodes to secondary raceme	0.48**	-0.21*	-0.28**	0.19*	0.42**	0.15	0.21*	0.10	0.11	-0.19*	-0.11	-0.28**	-0.29**	-0.05
10	Stem length to secondary raceme	0.52**	-0.24**	-0.26**	-0.01	0.53**	-0.28**	-0.24**	-0.41**	-0.14	-0.12	-0.47**	-0.39**	-0.47**	-0.28**
11	Total length of secondary raceme	0.15	0.02	0.16	0.57**	0.18*	0.18*	0.15	0.00	0.04	-0.01	0.23*	-0.02	0.19	0.34**
12	Effective length secondary raceme	0.14	-0.03	0.14	0.51**	0.21**	0.16	0.07	-0.04	0.05	-0.06	0.15	-0.09	0.12	0.25**
13	Days to 80% maturity of secondary raceme	0.87**	-0.30**	-0.31**	0.09	0.87**	-0.19*	-0.08	-0.30**	-0.10	-0.21*	-0.54**	-0.83**	-0.75**	-0.33**
14	Tertiary branches plant <sup>-1</sup>	-0.22**	0.38**	0.17	-0.01	-0.32**	-0.06	0.08	0.20*	-0.11	-0.11	-0.01	0.13	0.12	0.18*
15	Days to 50% flowering of tertiary raceme	1.00	-0.30**	-0.29**	0.02	0.85**	-0.11	0.03	-0.21*	-0.04	-0.25**	-0.52**	-0.71**	-0.70**	-0.28**
16	Nodes to tertiary racemes	-0.32**	1.00	0.43**	-0.10	-0.35**	0.16	0.13	0.28**	0.18*	0.15	0.15	0.28**	0.37**	0.28**
17	Stem length to tertiary raceme	-0.30**	0.46**	1.00	0.03	-0.30**	0.15	0.15	0.23*	0.05	0.25**	0.24**	0.27**	0.39**	0.24**
18	Effective length of tertiary raceme	0.03	-0.11	0.02	1.00	0.12	0.21*	0.13	0.11	0.11	-0.04	0.44**	0.09	0.31**	0.57**
19	Days to 80% maturity of tertiary raceme	0.87**	-0.39**	-0.30**	0.12	1.00	-0.14	-0.04	-0.26**	-0.04	-0.17	-0.45**	-0.74**	-0.64**	-0.23**
20	100 Seed weight of primary raceme	-0.11	0.21*	0.16	0.22*	-0.15	1.00	0.77**	0.75**	0.64**	0.11	0.32**	0.33**	0.38**	0.35**
21	100 Seed weight of secondary raceme	0.03	0.15	0.16	0.13	-0.04	0.85**	1.00	0.72**	0.49**	0.01	0.21*	0.30**	0.31**	0.36**
22	100 Seed weight of tertiary raceme	-0.22*	0.32**	0.26**	0.13	-0.28**	0.82**	0.81**	1.00	0.42**	0.09	0.34**	0.39**	0.42**	0.41**
23	Oil content (%)	-0.05	0.26**	0.05	0.13	-0.04	0.72**	0.55**	0.50**	1.00	0.06	0.16	0.27**	0.27**	0.28**
24	L/B ratio of seed	-0.27**	0.13	0.27**	-0.04	-0.19*	0.14**	0.03	0.08	0.08	1.00	0.11	0.26**	0.29**	0.10
25	Harvest index (%)	-0.55**	0.18*	0.25**	0.47**	-0.47**	0.33**	0.24**	0.39**	0.17	0.12	1.00	0.58**	0.74**	0.72**
26	Seed Yield plant <sup>-1</sup> at 120 days	-0.72**	0.30**	0.27**	0.09	-0.76**	0.35**	0.31**	0.43**	0.31**	0.28**	0.61**	1.00	0.84**	0.53**
27	Seed yield plant <sup>-1</sup> at 150 days	-0.71**	0.39**	0.39**	0.32**	-0.67**	0.41**	0.31**	0.46**	0.32**	0.33**	0.79**	0.85**	1.00	0.77**
28	Seed yield plant <sup>-1</sup> at 180 days	-0.29**	0.29**	0.25**	0.61**	-0.25**	0.40**	0.39**	0.47**	0.36**	0.12	0.79**	0.55**	0.78**	1.00

\* and \*\* = Significant at 0.05 and 0.01 levels of probability, respectively

Table 2. Direct and indirect effects (genotypic) between seed yield per plant and yield components in 54 genotypes of castor (*Ricinus communis* L.)

S.No.	Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Days to 50% flowering of primary raceme	<b>-0.153</b>	-0.117	-0.137	-0.039	-0.041	-0.130	-0.014	-0.137	-0.056	-0.074	-0.006	-0.010	-0.133	0.007
2	Stem length to primary raceme	0.236	<b>0.308</b>	0.235	0.089	0.088	0.234	-0.009	0.249	0.105	0.144	0.010	0.011	0.234	0.000
3	Nodes to primary raceme	0.703	0.597	<b>0.781</b>	0.113	0.090	0.630	0.157	0.640	0.271	0.321	-0.043	-0.049	0.624	-0.094
4	Total length of primary raceme	-0.233	-0.262	-0.131	<b>-0.906</b>	-0.834	-0.315	0.080	-0.394	-0.333	-0.339	-0.529	-0.469	-0.370	0.255
5	Effective length of primary raceme	0.288	0.303	0.122	0.974	<b>1.058</b>	0.353	-0.145	0.471	0.321	0.408	0.624	0.610	0.419	-0.341
6	Days to 80% maturity of primary raceme	-0.390	-0.348	-0.369	-0.159	-0.153	<b>-0.458</b>	0.007	-0.410	-0.199	-0.207	-0.049	-0.047	-0.417	0.033
7	Secondary branches plant <sup>-1</sup>	-0.014	0.004	-0.030	0.013	0.020	0.002	<b>-0.148</b>	-0.004	-0.022	-0.034	0.010	0.017	-0.010	-0.017
8	Days to 50% flowering of secondary raceme	-1.146	-1.031	-1.045	-0.554	-0.568	-1.141	-0.036	<b>-1.275</b>	-0.705	-0.657	-0.264	-0.262	-1.189	0.219
9	Nodes to secondary raceme	0.068	0.064	0.065	0.069	0.057	0.082	0.027	0.104	<b>0.187</b>	0.068	0.030	0.022	0.092	-0.036
10	Stem length to secondary raceme	0.035	0.033	0.029	0.027	0.027	0.032	0.016	0.037	0.026	<b>0.071</b>	0.015	0.019	0.039	-0.015
11	Total length of secondary raceme	0.008	0.007	-0.011	0.122	0.123	0.022	-0.013	0.043	0.033	0.046	<b>0.209</b>	0.196	0.039	-0.043
12	Effective length of secondary raceme	-0.010	-0.006	0.010	-0.085	-0.094	-0.017	-0.019	-0.034	-0.019	-0.043	-0.153	<b>-0.163</b>	-0.030	0.041
13	Days to 80% maturity of secondary raceme	0.586	0.510	0.537	0.274	0.266	0.613	0.046	0.627	0.329	0.373	0.127	0.122	<b>0.672</b>	-0.149
14	Tertiary branches plant <sup>-1</sup>	-0.025	0.000	-0.065	-0.151	-0.173	-0.038	0.062	-0.092	-0.103	-0.113	-0.111	-0.133	-0.119	<b>0.537</b>
15	Days to 50% flowering of tertiary raceme	0.559	0.489	0.518	0.271	0.281	0.544	0.102	0.623	0.335	0.350	0.101	0.093	0.581	-0.152
16	Nodes to tertiary racemes	0.048	0.050	0.051	0.023	0.010	0.043	-0.028	0.057	0.037	0.038	-0.003	0.005	0.048	-0.065
17	Stem length to tertiary raceme	-0.003	-0.002	-0.004	0.001	0.002	-0.004	-0.003	-0.003	-0.004	-0.003	0.002	0.002	-0.004	0.002
18	Effective length of tertiary raceme	-0.002	0.004	-0.006	0.030	0.020	0.000	-0.008	0.009	0.013	-0.001	0.042	0.038	0.007	-0.001
19	Days to 80% maturity of tertiary raceme	0.100	0.090	0.090	0.059	0.060	0.102	-0.004	0.112	0.056	0.069	0.024	0.028	0.114	-0.044
20	100 Seed weight of primary raceme	-0.076	-0.060	-0.053	0.120	0.131	-0.030	-0.062	-0.020	0.069	-0.113	0.073	0.064	-0.076	-0.021
21	100 Seed weight of secondary raceme	-0.009	-0.034	-0.047	-0.147	-0.172	0.000	0.098	-0.050	-0.122	0.145	-0.093	-0.043	0.047	-0.046
22	100 Seed weight of tertiary raceme	-0.026	-0.023	-0.022	0.007	0.015	-0.018	-0.012	-0.017	0.013	-0.044	0.001	-0.004	-0.033	0.021
23	Oil content (%)	-0.007	-0.005	-0.008	0.030	0.032	-0.003	-0.015	-0.002	0.011	-0.015	0.006	0.006	-0.008	-0.006
24	L/B ratio of seed	0.029	0.009	0.024	0.002	0.000	0.024	0.008	0.024	0.018	0.010	0.000	0.005	0.017	0.011
25	Harvest index (%)	-0.491	-0.502	-0.478	0.087	-0.003	-0.478	-0.006	-0.436	-0.127	-0.413	0.207	0.121	-0.461	0.030
26	Seed Yield plant <sup>-1</sup> at 120 days	0.073	0.053	0.062	0.013	0.013	0.073	0.016	0.071	0.029	0.039	0.002	0.009	0.080	-0.014
27	Seed yield plant <sup>-1</sup> at 150 days	-0.520	-0.396	-0.483	0.013	-0.013	-0.517	-0.091	-0.486	-0.205	-0.329	0.139	0.083	-0.514	0.086
28	Correlation with seed yield plant <sup>-1</sup> at 180 days	<b>-0.372**</b>	<b>-0.263**</b>	<b>-0.364**</b>	<b>0.297**</b>	<b>0.241*</b>	<b>-0.395**</b>	0.042	<b>-0.295**</b>	<b>-0.041</b>	<b>-0.303**</b>	<b>0.369**</b>	<b>0.269**</b>	<b>-0.351**</b>	<b>0.199*</b>

Table 2 contd. Direct and indirect effects (genotypic) between seed yield per plant and yield components in 54 genotypes of castor (*Ricinus communis* L.)

S.No	character	15	16	17	18	19	20	21	22	23	24	25	26	27
1	Days to 50% flowering of primary raceme	-0.129	0.047	0.045	0.004	-0.120	0.029	-0.002	0.040	0.012	0.056	0.094	0.118	0.119
2	Stem length to primary raceme	0.228	-0.098	-0.061	0.018	0.218	-0.046	0.019	-0.069	-0.018	-0.034	-0.194	-0.173	-0.183
3	Nodes to primary raceme	0.612	-0.254	-0.293	-0.066	0.550	-0.105	0.066	-0.168	-0.066	-0.233	-0.469	-0.515	-0.567
4	Total length of primary raceme	-0.371	0.134	-0.089	-0.386	-0.421	-0.275	-0.239	-0.065	-0.303	0.019	-0.099	0.128	-0.018
5	Effective length of primary raceme	0.450	-0.065	0.156	0.304	0.498	0.350	0.327	0.153	0.386	0.004	-0.004	-0.142	-0.020
6	Days to 80% maturity of primary raceme	-0.376	0.127	0.150	0.002	-0.366	0.035	0.000	0.081	0.015	0.138	0.275	0.355	0.356
7	Secondary branches plant <sup>-1</sup>	-0.023	-0.027	0.033	0.016	0.005	0.023	0.026	0.018	0.025	0.014	0.001	0.024	0.020
8	Days to 50% flowering of secondary raceme	-1.201	0.464	0.363	-0.152	-1.121	0.065	-0.115	0.215	0.027	0.379	0.697	0.961	0.931
9	Nodes to secondary raceme	0.095	-0.044	-0.055	0.035	0.082	0.032	0.041	0.023	0.022	-0.042	-0.030	-0.058	-0.058
10	Stem length to secondary raceme	0.038	-0.017	-0.019	-0.001	0.038	-0.020	-0.018	-0.031	-0.012	-0.009	-0.037	-0.029	-0.035
11	Total length of secondary raceme	0.032	0.004	0.035	0.122	0.040	0.038	0.035	0.001	0.014	0.000	0.054	-0.004	0.044
12	Effective length secondary raceme	-0.023	0.006	-0.023	-0.086	-0.036	-0.027	-0.013	0.007	-0.010	0.009	-0.025	0.015	0.040
13	Days to 80% maturity of secondary raceme	0.590	-0.209	-0.209	0.063	0.601	-0.129	-0.057	-0.218	-0.062	-0.147	-0.389	-0.566	-0.519
14	Tertiary branches plant <sup>-1</sup>	-0.123	0.223	0.092	-0.005	-0.185	-0.028	0.044	0.115	-0.039	-0.073	0.020	0.078	0.070
15	Days to 50% flowering of tertiary raceme	<b>0.661</b>	-0.210	-0.195	0.017	0.575	-0.074	0.018	-0.145	-0.031	-0.180	-0.366	-0.478	-0.469
16	Nodes to tertiary racemes	0.049	<b>-0.156</b>	-0.072	0.018	0.061	-0.032	-0.023	-0.049	-0.040	-0.021	-0.028	-0.046	-0.060
17	Stem length to tertiary raceme	-0.004	0.006	<b>0.012</b>	0.000	-0.004	0.002	0.002	0.003	0.001	0.003	0.003	0.003	0.005
18	Effective length of tertiary raceme	0.002	-0.008	0.002	<b>0.071</b>	0.009	0.016	0.009	0.009	0.009	-0.003	0.033	0.007	0.023
19	Days to 80% maturity of tertiary raceme	0.111	-0.050	-0.039	0.016	<b>0.127</b>	-0.019	-0.005	-0.036	-0.005	-0.024	-0.060	-0.097	-0.086
20	Seed weight of primary raceme	-0.044	0.082	0.063	0.088	-0.058	<b>0.396</b>	0.336	0.325	0.286	0.054	0.132	0.138	0.162
21	100 Seed weight of secondary raceme	-0.015	-0.081	-0.088	-0.072	0.021	-0.471	<b>-0.556</b>	-0.450	-0.306	-0.015	-0.131	-0.175	-0.174
22	100 Seed weight of tertiary raceme	-0.022	0.032	0.026	0.013	-0.028	0.082	0.081	<b>0.100</b>	0.050	0.008	0.039	0.043	0.046
23	Oil content (%)	-0.004	0.023	0.005	0.011	-0.004	0.064	0.049	0.045	<b>0.089</b>	0.007	0.015	0.027	0.029
24	L/B ratio of seed	0.022	-0.011	-0.021	0.003	0.015	-0.011	-0.002	-0.007	-0.007	<b>-0.080</b>	-0.010	-0.022	-0.026
25	Harvest index (%)	-0.441	0.143	0.197	0.372	-0.376	0.265	0.188	0.308	0.136	0.099	<b>0.797</b>	0.485	0.629
26	Seed Yield plant <sup>-1</sup> at 120 days	0.068	-0.028	-0.026	-0.009	0.072	-0.033	-0.030	-0.041	-0.029	-0.026	-0.057	<b>-0.094</b>	-0.080
27	Seed yield plant <sup>-1</sup> at 150 days	-0.472	0.257	0.263	0.215	-0.447	0.272	0.208	0.305	0.215	0.218	0.525	0.564	<b>0.665</b>
28	Correlation with seed yield plant <sup>-1</sup> at 180 days	-0.2912**	0.2902**	0.2518**	0.6119**	-0.2542**	0.4001**	0.3889**	0.4683**	0.3602**	0.123	0.7859**	0.5464**	0.7828**

\* and \*\* = Significant at 0.05 and 0.01 levels of probability, respectively

flowering of tertiary raceme, days to 80% maturity of tertiary raceme were correlated significantly and positively among themselves and days to 50% flowering of primary raceme showed significant negative association with seed yield plant<sup>-1</sup> at 120 days and seed yield plant<sup>-1</sup> upto 150 days. Obviously decrease in any one of the character would lead to the earliness.

Path coefficient analysis revealed that harvest index, seed yield plant<sup>-1</sup> upto 150 days, tertiary branches plant<sup>-1</sup> and 100 seed weight of primary raceme exerted highest direct effect on seed yield plant<sup>-1</sup> up to 180 days. These results are in accordance with Ravi *et al.*, 2006, Yadav *et al.*, 2004 while total length of primary raceme, days to 80% maturity of primary raceme showed negative direct effect (Table 2) (Khorgade *et al.*, 1994 and Golakia *et al.*, 2007).

Total length of primary raceme, which showed positive association with seed yield plant<sup>-1</sup> upto 180 days gave negative direct effect. This is in accordance with Khorgade *et al.*, (1994). This positive association with seed yield plant<sup>-1</sup> seems to be due to its indirect influence via effective length of primary raceme, days to 80% maturity of secondary raceme, effective length of tertiary raceme, days to 80% maturity of tertiary raceme and oil content. Hence, these characters may be given due weightage while practicing the selection for high seed yield in castor.

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