REFERENCES

AMETA, G.S. and SINGH, H.G. (1990) Comparative efficiency of neem cake coated prilled urea and splitting N application in rice production. Inter. J. Trop. Agri 8 : 189-192.

DEVASENAPATHY, P (1994) Studies on band placement of urea solution in lowland rice soil in comparison with other methods of N application. Ph.D., Thesis, Tamil Nadu Agric.Univ.,Coimbatore.

DEVASENAPATHY, P and PALANIAPPAN, SP (1995). Band placement of urea solution increase N use efficiency in transplanted lowland rice. IRRN 20(3): p 19.

DINGTUHN, M., SCHNIER, H.F., DEDATTA, S.K., DORFFLING, K., JAVAELLANA, C. and WIJANGCO, J.E. (1987). Crop photosynthesis, crop antogeny and yield in relation to planting technique and input timing in lowland rice. p39. Agronomy Abstract, Madison, Wisconsin.

DUTTA, R.K. DEY, J.K. and BHATTACHARJEE, I.R. (1995) Managing nitrogen fertilizer for deep water rice. IRRN 20(2):p.17.

PILLAI, K.G. 1996. Current scenario in rice and prospects for sustainable rice production. Fert. News 41(2) 15-33

SCHNIER, H.F., DEDATTA, S.K. MENGEL, K. MARQUESES, E.P. and FARONILO, J.E. (1988). Nitrogen use efficiency, flood water properties, and nitrogen-15 balance in transplanted lowland rice as effectd by liquid urea band placement. Fert.Res. 16: 241-255.

SHAD, R.A.and DEDATTA, S.K. (1986). Evaluation of methods of crop establishment in wetland rice. Pakistan J.Agric.Res. 7: 186-192.

SHARMA, S.N. and RAJENDRA PRASAD (1980) Relative efficiency of urea, nitrification inhibitor treated urea and sulphur coated urea for rice. Indian J.Agron. 25: 403-409.

VENKITASWAMY, R. (1986). Effect of modified forms of urea on nitrogen use efficiency and their interaction with weed management in lowland rice. Ph.D. Thesis, Tamil Nadu Agric. Univ. Coimbatore.

(Received : December 1997 Revised : April 2000)

Madras Agric. J., 86(7-9): 456 - 459 July - September 1999
https://doi.org/10.29321/MAJ.10.A00645

GENETIC VARIABILITY, CORRELATION AND PATH COEFFICIENT ANALYSIS IN CASTOR (*Ricinus communis* L.)

S. SEVUGAPERUMAL P. RANGASAMY and N. MUPPIDATHI

Department of Agricultural Botany
Aricultural college and Research Institute, Madurai,
Tamil Nadu Agricultural University MADURAI - 625 104.

ABSTRACT

Thirty six castor genotypes were evaluated for gentic parameters. Moderate to high heritability coupled with high genetic advance was noticed for single plant yield, plant height, 100 seed weight, length of primary raceme and racemes per plant attributed due to additive genes. The correlation Co-efficient and path analysis revealed that length of primary raceme, capsules in primary receme, racemes per plant and 100 seed weight were the major yield contributing characters.

KEY WORDS : Castor, Variability, Correlation, Path co-efficients

Castor (*Ricinus communis L*)is an important non-edible oilseed crop in which limited work has been carried out for its useful exploitation. In order to underdstand the variability present in the population and direct and indirect influence of yield contributing characters on yield, 36 genotypes of castor were subjected to variance, heritability, genetic advance, correlation co-efficients and path co-efficients studies.

MATERIALS AND METHODS

Thirty six genotypes of castor were raised at Agricultural college and Research Institute, Tamil Nadu Agricultural University, Madurai during 1992-93 in a randomised block design with three replications. Each genotype was raised in two rows of 4.8 m length adopting a spacing of 90 cm between rows and 60 cm between plants. Five plants where selected at random and observations were recorded on days to 50 percent flowering, plant height, number of nodes upto primary raceme, number of recemes per plant, 100 seed weight and single plant yield.

The phenotypic and genotypic variances and genetic advance were calculated according to Johnson *et al* (1955). Phenotypic and genotypic

Table 1. Variability, heritability and genetic advance for eight characters in castor

Sl No.	Characters	Range		Mean	Variance		Co-efficient of variation(%)			Herita-blity (broad sence)	Genetic advance (GA)	GA as per cent of mean
		From	To		Geno-typic	Pheno-typic	Geno-typic (GVC)	Pheno-typic (PVC)	PCV GCV			
1.	Days to 50 per cent flowering	56	99.7	80.8	98.91	172.33	12.32	16.26	3.94	57.40	15.52	19.22
2.	Plant height (cm)	54.0	163.7	97.7	725.81	763.73	27.56	28.27	0.71	95.04	54.11	55.35
3.	No. of nodes upto primary raceme (cm)	12.3	22.3	18.0	4.33	9.72	11.57	17.34	5.77	44.52	2.86	15.91
4.	Length of primary raceme (cm)	25	40.3	30.7	11.26	15.86	10.93	12.98	2.05	71.00	5.83	18.98
5.	No. of capsules in primary raceme	11	31.0	19.5	13.93	25.02	19.12	25.63	6.51	55.67	5.74	29.39
6.	No.of racemes per plant	2.7	9.3	4.5	1.70	2.69	28.69	36.11	7.42	63.09	2.13	46.94
7.	100 seed weight (g)	19.1	36.1	28.3	17.32	22.38	14.73	16.74	2.01	77.39	7.54	26.69
8.	Single plant yield (g)	27.7	98.0	57.3	285.15	291.00	29.48	29.78	0.30	97.99	34.43	60.11

co-efficients of variability (Burton 1952), heritanility in broad sense (Lush, 1940) and path co efficient analysis for grain yield per plant (Dewey and Lu, 1959) were anlysed.

RESULTS AND DISCUSSION

The variances due to genotypes for all the traits were found to be significant. The range, phenotypic and genotypic variances, PCV and GCV.

Table 2. Genotypic (G) and Phenotypic (P) correlation co-efficient among the characters in castor

Characters		Days to 50 per cent flowering	Plant height	No.of Nodes upto primary raceme	Length of primary raceme	No. of Capsules in primary raceme	No. of racemes per plant	100 seed weight	Single Plant yield
Days to 50 per cent flowering	G		0.41**	0.91**	0.11	0.40*	0.31**	0.04	0.35**
	P		0.32**	0.75**	0.03	0.19	0.21*	0.04	0.24*
Plant height	G			0.54**	0.41*	0.28**	0.27**	0.14	0.04
	P			0.36**	0.35*	0.23*	0.20*	0.12	0.04
No.of nodes upto primary raceme	G				0.06	0.41**	0.38**	0.03	0.18
	P				0.05	0.11	0.31**	0.01	0.09
Length of primary raceme	G					0.58**	0.12	0.44**	0.22*
	P					0.43**	0.01	0.28**	0.20*
No. of capsules in primary raceme	G						0.19	0.30**	0.47**
	P						0.03	0.18	0.37**
No. of racemes per plant	G							0.04	0.31**
	P							0.03	0.26**
100 Seed weight	G								0.21*
	P								0.19

* Significant at 5 per cent level

** Significant at 1 per cent level

Table 3. Direct and Indirect effects of seven characters on yield in castor

Characters	Days to 50 per cent flowering	Plant height	No.of Nodes upto primary raceme	Length of primary raceme	No. of Capsules in primary raceme	No. of racemes per plant	100 seed weight	Correlation with single plant yield
Days to 50 per cent flowering	1.18	0.06	-1.01	0.01	0.25	-0.12	-0.02	0.35
Plant height	0.48	0.14	-0.59	0.01	0.18	-0.11	-0.07	0.04
No. of nodes upto primary raceme	1.08	0.08	-1.11	0.01	0.26	-0.15	0.02	0.18
Length of primary raceme	0.13	0.06	-0.07	0.01	0.35	-0.05	-0.21	0.22
No. of Capsules in primary raceme	0.48	0.04	-0.46	0.01	0.61	-0.07	-0.14	0.47
No. of racemes per plant	0.37	-0.04	0.44	-0.01	-0.12	0.39	0.02	0.31
100 seed weight	-0.04	-0.02	-0.03	-0.01	-0.19	0.02	0.48	0.21

heritability and genetic advance are furnished in Table 1.

The genotypic variance was found to be less than the phenotypic variance for all the eight characters studied. The GCV was maximum for single plant yield (29.48%) followed by number of recemes per plant (28.69%) and plant height (27.56%). The difference between PCV and GCV was minimum for single plant yield (0.30) suggessing that this trait was least effected by environment (Table 1). Moderate to high heritabality coupled with high genetic advance was recored for single plant yield, plant height, 100 seed weight, length of primary receme, and number of recemes per plant (Table 1). These traits had higher selection value, attributed to a high degree of additive genetic effects (Panse, 1957).

The genotypic and phenothpic and phenotypic correlations of single plant yield were significantly positive with days to 50 percent flowering, number of capsules in the primary receme,number of recemes per plant, length of primary receme and 100 seed weight (Table 20. Singh and yadava (1981) and Patel and Jamini (1991) reported similar associations. While exercising selection, emphasis must be laid on the above said characters which provide simultaneous improvement on seed yield.

The genotypic pathway revealed that days to 50n percent flowering had more dirct emphasis on seed yield. This was folloed by number of capsules in primary receme, 100 seed weight and nymber of recemes per plant. The number of nodes upto primary receme showed negative direct influence on seed yield (Table 3). Patel and Jaimini (1991) found similar type of contribution towards yield in caster. The indirect effect of number of nodes upto primary receme, plant height and number of capsules in primary receme through days to flowering was substantial. The pronounced indirect effect for yield was noticed in the number of capsules on primary receme, days to flowering and number of recemes per plant. The above said facts indicated selection on these traits will result in increased seed yield.

REFERENCES:

BURTON, G.W. (1952). Quantitative inheritance in grasses. **Proc. Sixth. Int. Grassland Congr., 1** : 217-283.

DEWEY, D.R. Lu k.h. (1959). A correlation and path analysis of Components of nested wheat grass seed production. **Agron. J. 51** : 399-433.

JOHNSON, H.W. ROBINSION, H.P. and COMSTOCK, R.E. (1955) Estimates of genetic and environmental variability in soybeans. **Agron J. 47** : 317-318.

LUSH, J.L. (1940). Intra - sire Correclation and regression of offspring in rams as a method of estimating heritability of characters. **Proc. Amer. Soc. Animal Prodn. 33** : 293-301.

PANSE, V.G. (1957). Genetics of quantitative characters in selection to plant breeding. **Indian J. Genet: 17 :** 318-328.

PATEL, P.S. anda JAIMINI.S.N. (1991). Interrelationship and path analysis of certain quantitative characters in castor (RICINUS COMMUNI L.). **J. Oil seeds Res. 8 : 105-108.**

SINGH, H. and YADAVA. (1981). Genetic analysis of days to flowering, maturity and yield in castor. **Haryana Agric. Univ. J. Res. 11 (1) : 54-59.**

(Received : February 1998 Revised : September 1998)

Madras Agric. J., 86(7-9): 459 - 460 July - September 1999

EFFECT OF SEED RATE AND NITROGEN LEVELS ON HYBRID RICE (*Oryza Sativa*)

K. RAJENDRAN and R. VEERAPUTHIRAN

Department of Rice, Tamil Nadu Agricultural University, Coimbatore-641 003.

ABSTRACT

Field experiments were conducted during *Kuruvai* season (June to September) 1996 and 1997 on hybrid rice ADTRH1 to study the effect of four nitrogen levels (0,75,150 and 225kg ha^{-1}) and three seed rates in nursery (10,20 and 30g m^{-2}). The results revealed that there was significant increase in plant haight, dry matter accumulation, productive tillers/m^2, panicle weight and grain yield with an increase in the level of nitrogen from 0 to 150 kg/ha further increase in N rate upto 225 kg ha^{-1}did not show significant increase. Straw yield was found significant upto 225 kg N/ha. The seed rate 10 g/m^2 recorded the highest grain yield, followed by 20 and 30 g/m^2. The growth and yield attributes except plant height were significantly higher with 10 g/m^2 of seed rate than the other rates.

KEY WORDS: Seed rate, Nitrogen levels, Hybrid rice, Grain yield.

Plant growth and development are influenced substantially by nitrogen application in rice. The direct bearing of N on source parameters influences the sink size of rice, thereby increasing grain yield of rice. Seed rate manipulation in nursery increases seedling vigour which helps to increase resultant energy of rice by means of grain yield (Singh *et al.*, 1987). On introduction of hybrid rice in India, it is necessary to study the influence of N on growth and yield of the crop.

MATERIALS AND METHODS

A field experiment was taken up during *kuruvai* season (June to September) of 1996 and 1997 at Wetland Farm, TNAU, Coimbatore. The experiment was laid out in split plot design with three replications. Four nitrogen levels (0, 75, 150 and 225 kg/ha) were kept in main plots and three seed rates in nursery (10, 20 and 30 g/m^2) were allotted in subplots. The soil was clay loam with 7.8 pH, 0.23 percent organic carbon and 0.43 dsm^{-1} electrical conductivity and 125.3, 10.5 and 465.2 kg ha^{-1} of available N,P and K respectively. Hybrid rice ADTRH1 was transplanted on 15 and 17 June during 1996 and 1997 respectively at a spacing of 20x15/cm with one seedling/hill. Basal dose of 50kg P_2O_5 and 50 kg K_2O was broadcasted uniformally and $ZnSo_4$ 25 Kg/ha was applied after transplanting. Nitrogen was applied in three equal splits viz., 7 days after transplanting (DAT), active tillering and panicle initiation stage. The observation on plant height, number of productive tillers/m^2 and dry matter accumulation was recorded at harvest.

RESULTS AND DISCUSSION

There was significant increase in plant height, number of productive tillers/m^2 and dry matter accumulation with each successive increase in N from 0 to 225 kg/ha (Table 1). Addition in N dose from 150 to 225 kg/ha could not bring significant improvement in the above parameters. However, the maximum values of yield attributes were recorded in the highest N level. Plant height was relatively lesser, whereas productive tillers/m^2 and dry matter accumulation were higher in 1996 than in 1997. This might be due 41.5 percent more bright sunshine hours in 1996 than in 1997 during July-August. Murty *et al.* (1975) and Venkateswarlu *et al.* (1977) reported beneficial effect of bright