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Research Article

Studies on genetic parameters, correlation and path analysis for yield attributes in the maintainer and restorer lines of pearl millet [*Pennisetum glacum.(L.*) R.Br]

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Abstract
A set of forty-two maintainers and seventeen restorer lines were evaluated in RCBD(Randomized Complete Block Design) design during *Kharif* 2018 with a view of studying genetic parameters and association studies for eleven quantitative characters. Analysis of variance indicated that significant differences were observed for all studied characters in the experimental materials. The values of PCV were higher than GCV but in a narrow range indicating that the least influence of environment on the expression of traits. Estimates of high heritability coupled with high genetic advance as a percentage of mean were observed for the characters *viz*., leaf sheath length, leaf blade length, spike length, spike girth, plant height, 1000 seed weight and single plant yield suggesting that these characters are governed by additive gene action. Correlation and path analysis studies revealed that number of productive tillers/plant and 1000 grain weight could be considered as good selection indices for selecting genotypes for yield improvement.

Key words
Pearl millet, genetic variability study, Correlation, path analysis, characters

Introduction

Pearl millet [*Pennisetum glacum.(L).R.Br*] is an important warm season cereal crop where it was staple food for millions of people in arid and semi-arid tropics. It is a robust, quick growing and high tillering capacity with high yielding potential. Pearl millet crop can able to grow under the adverse agro-climatic condition where other cereal crops like maize and sorghum fail to produce economic yields. It is an eighth major world cereal and fifth major crop after wheat, rice, maize and sorghum in India. India is a major pearl millet producing country in both area and production wise.

The past four decades witnessed for improvement of productivity of major cereal crop achieved through the breeding of high yielding cultivars with improved agronomic practices. The development of superior varieties/ hybrids mainly depends on the magnitude of variation and heritability present in an experimental material. The extent of variation is measured by GCV and PCV which gives information about variation present in the studied characters. Heritability along with genetic advance has played a major role in determining the effective selection of experimental material for crop improvement. Selection of material on the basis of yield characters alone is not effective and efficient. So, selection based on its components and secondary characters could be more efficient for the development of superior varieties/hybrid. Therefore, generating information on association of yield with yield attributing characters will improve the efficiency of selection in a breeding program.

Materials and Method

The experiment was conducted at Department of millet, TNAU, Coimbatore during *Kharif* 2018. The genetic material comprised of 42 B lines and 17 R lines which were raised in a Randomized Complete Block Design(RCBD) with two replications. Each entry was raised in two rows with spacing of 45x15 cm. All the recommended agronomic package of practices was followed properly during crop growth. Observations were recorded for five randomly selected plants from each entry in each replication for 11 quantitative characters *viz.*, Days to 50% flowering,, leaf blade length, leaf blade width, leaf sheath length, number of productive tillers/ plant, spike length, spike girth, plant height, 1000 grain weight, single plant yield and dry fodder yield. All the statistical analysis was done by WINDOWSTAT ver 7.1. The results and salient findings are presented

Result and Discussion

The analysis of variance indicated that significant difference exist among the genotypes for all the

studied characters indicated that sufficient variability are present in the experimental material.

In general, the mean value of almost all the characters except days to 50% flowering and number of productive tillers was higher in restorer lines than in the maintainer lines for the desirable characters. Leaf sheath length showed high mean (11.90) cm and range (9.62 – 13.92) cm among the restorer lines. Among these 17 restorer lines, four lines (PT 6067, PT 6069, PT 6347 and PT 6684) had high mean and range. The yield attributing characters *viz*., spike length (PT 6024, PT 6067, PT 6069, PT 6347 and PT 6697), spike girth (PT 6707 and PT 6715) and 1000 seed weight (PT 6024, PT 6069, PT 6347, PT 6694, PT 6607, PT 6707.PT 6715 and PT 6676) showed wide variation(Table 1) in the restorer lines than the maintainer lines.

Among the 11 characters, leaf blade width, plant height and single plant yield exhibited a wide range of variation in the restorer lines. For leaf blade width, the lines viz., PT 6024, PT 6029, PT 6069, PT 6686, PT 6693, PT 6694, PT 6697, PT 6707 and PT 6715 displayed high mean and range compared to maintainer lines. For plant height, eight lines were recorded high mean and range. Single plant yield showed high mean (104.40) and range (52.15 – 151.44) in the restorer lines. The restorer lines PT 6029, PT 6069, PT 6686, PT 6694, PT 6607 and PT 6715 had high mean and range value for SPY. Among these eleven characters, days to 50% flowering and number of productive tillers/plant showed more variation in the maintainer lines compared to restorer lines. Out of 42 maintainer lines CBMS-178 B/9-5 and CBMS-179 A/4-6 exhibited early flowering and CBMS-135 B/1-2, CBMS-167 B/1-1, CBMS-174 B/1-1, CBMS-174 B/1-2, CBMS-174 B/1-5 and CBMS-178 B/8-5 showed high mean and range for number of productive tillers/plant. From these *perse* performance it was revealed that much variation observed among the maintainer and restorer lines hence it can be used for further breeding programme. There was a wide range of variation for all studied characters for all the genotypes would provide the better scope of selection of plants for improvement of characters and development of desired genotypes.

In general, PCV was higher than GCV for all the studied characters. It suggested the role of environment influence on the expression of characters. The difference was narrow for the traits except for dry fodder yield indicating that these ten characters were least influenced by the environment.(Table 2) Similar results were reported by Subbulakshmi *et al.* (2018).If any selection pressure operated on these characters will help to improve the genotypes. High values of GCV and PCV observed for the characters *viz*., leaf blade length, spike girth, plant height 1000 grain weight and single plant yield indicating variation present in these characters contributed to total variability and also scope for genetic improvement through selection. Similar observations were also reported for spike girth, plant height and single plant yield by Dapke *et al.* (2014); Manga (2013); Sumathi and Revathi (2017) and Talawar *et al.* (2017). Moderate GCV and PCV observed for the characters leaf blade width, spike length and number of productive tillers. It indicated that selective breeding could be done in these characters. Similar findings were reported for spike length by Choudhary *et al.* (2012); Mukh *et al.* (2014) and Sumathi *et al.* (2010). Days to 50% flowering and leaf sheath length had low GCV and PCV indicating lesser variability present in the experimental material. Similar results were reported for days to 50% flowering by Anuradha *et al.* (2018) ,Choudary *et al* (2012) and Ramya *et al.* (2018).

Estimation of heritability reflects the portion of genetic variability which is transmitted from parents to offspring. High heritability observed for all the studied characters except no of productive tillers/ plant which showed moderate heritability. Heritability ranges from 53.1% (no of productive tillers/ plant) to 99.2% (plant height). Similar results were reported by Kumar *et al.* (2014); Singh and Singh (2016); Sumathi *et al.* (2010) and Talawar *et al.* (2017).The expected genetic advance as a percentage of mean was found to be moderate for days to 50% flowering and leaf sheath length and rest of the studied characters showed high GAM. High heritability coupled with high genetic advance as percentage of mean were recorded for leaf sheath length, leaf blade width, spike length, spike girth, plant height, 1000 seed weight and single plant yield whereas number of productive tillers/plant showed moderate heritability combined with high GAM which indicated that additive gene action on the expression of these characters which is revealed effective selection of desirable genotypes. In such cases improved by recurrent selection, synthetics and composites may be followed. Similar results were reported by Subbulakshmi *et al.* (2018) . The present findings are similar with earlier results of Singh *et al.* (2016); Sumathi *et al.* (2010) and Bhasker *et al.* (2017) for dry fodder yield, plant height and spike length.

The higher coefficient of variation was present in the experimental material indicating that possibility of improving characters through phenotypic selection. Estimates of high co efficient of variation

with high heritability and high genetic advance as percentage of mean were observed for the characters *viz.,* leaf sheath length, spike length, plant height, 1000 grain weight and single plant yield showed additive gene action for these traits. Correlation studies provide a natural relationship between various plant characters on yield and yield components on the selection of genotypes for genetic improvement in yield. The genotypic and phenotypic correlation between all possible combinations of characters is presented in Table 3. Moreover genotypic correlation coefficient was higher than their phenotypic correlation coefficient for all characters under study. Single plant yield had a positive and significant correlation with no of productive tillers/plant, plant height , spike girth, , and 1000 grain weight. The present findings are in agreement with earlier studies of Singh *et al.* (2016) and Kumar *et al.* (2014) and Talawar *et al.* (2017) for spike girth. On contrary Sudarshan Patil *et al.* (2018) found single plant yield displayed negative significant correlation with number of productive tillers/plant.

Inter-correlation result showed that plant height had a positive significant correlation with single plant yield, leaf sheath length. Leaf blade length, spike length, spike girth, and 1000 grain weight and it had a significant negative correlation with number of productive tillers/plant. Similar findings were reported for plant height towards yield by Choudhary *et al.* (2012); Dapke *et al.* (2014); Ezeaku *et al.* (2015); Izge *et al.* (2006); Kumar R (2014); Kumar *et al.* (2014); Sharma *et al.* (2018); Sudarshan Patil *et al.* (2018) and Sumathi *et al.* (2017). Number of productive tillers /plant expressed positive significant correlation with single plant yield which is similar to earlier findings of Choudhary *et al.* (2012); Dapke *et al.* (2014). Number of productive tillers/plant had negative and significant correlation with days to 50% flowering, leaf sheath length, leaf blade length, spike length, spike girth, 1000 grain weight similar findings were reported by Sudarshan Patil *et al.* (2018). However Singh *et al.* (2016) and Talawar *et al.* (2017) reported that a number of productive tillers/plant showed negative effect with yield . Spike girth and 1000 seed weight are important yield attributing characters showed significant and positive correlation towards the characters *viz.,* single plant yield, days to 50% flowering, leaf sheath length, leaf blade length, spike length and plant height indicating their contribution towards yield improvements. Similar results were obtained for 1000 grain weight towards yield by Abuali *et al.* (2012); Choudhary *et al.* (2012) and Sumathi *et al.* (2017)

The estimation of correlation alone may be often misleading to the mutual cancelation of components characters it is necessary to study path coefficient analysis which provides a degree of relationship. Path coefficient analysis defines partitioning of the correlation coefficient into direct and indirect effect to know the relative importance of the component traits. The direct and indirect effect on these components determining grain yield at both phenotypic and genotypic level are presented (Table 4)

Path coefficient analysis reflected that 1000 seed weight(1.280) followed by number of productive tillers/plant (0.844) had high positive direct effect on single plant yield. Leaf sheath length(-0.292) and spike girth(-0.292) exhibited a moderate direct negative effect on single plant yield. Similar results were reported by Dapke *et al.* (2014); Kumar *et al.* (2014) for number of productive tillers/plant on single plant yield.

Thousand seed weight had a high positive indirect effect on single plant yield via days to 50% flowering, leaf sheath length, leaf blade length, spike length, spike girth, plant height whereas number of productive tillers/plant displayed high negative indirect effect on yield through 1000 seed weight. The indirect effect on single plant yield by spike length and spike girth was made through number of productive tillers/plant. The present findings were in agreement with earlier reported by Izge *et al.* (2006).

Based on the present study it can be concluded that the values of PCV were higher than GCV but in a narrow range for almost all the studied characters indicating the least influence of the environment. The characters *viz.,* spike length, spike girth, 1000 seed weight, leaf sheath length, leaf blade length, plant height, and single plant yield exhibited high heritability coupled with high GAM. Association studies revealed that spike girth, no of productive tillers/plant, plant height and 1000 seed weight should be considered as major characters while selecting the genotypes for yield improvement because it expressed high positive significant correlation with yield. Path analysis also revealed that number of productive tillers/plant and 1000 grain weight had a high positive direct effect on yield and a high indirect effect through most of the other characters. Correlation and path analysis revealed that number of productive tillers/plant and 1000 grain weight could be considered as good selection indices for selecting genotypes for yield improvement.

Reference

Abuali, A. I., Abdelmulla, A. A., and Idris, A. E. (2012). Character association and path analysis in pearl millet (Pennisetum glaucum L.). *Am. J. Exp. Agric.*, **2**(3), 370.

Anuradha, N., Satyavathi, C. T., Bharadwaj, C., Sankar, M., Singh, S. P., and Pathy, T. L. (2018). Pearl millet genetic variability for grain yield and micronutrients in the arid zone of India. *J. Pharmacog. Phytochem.*, **7(**1), 875-878.

Bhasker, K., Shashibhushan, D., Murali Krishna, K., and Bhave, M. (2017). Genetic Variability, Heritability and Genetic Advance of Grain Yield in Pearl Millet (Pennisetum glaucum (L.) R. Br.). *Int. J. Pure Appl. Biosci.*, **5**(4), 1228-1231.

Choudhary, R., Jat, B., Anwale, R., Dhikwal, S., and Sharma, K. (2012). Studies on estimates of genetic variability and character association of yield components and protein content in pearl millet. *Forage Res.*, **38,** 80-85.

Dapke, J., Shah, D., Pawar, G., Dhembre, V., and Kumar, M. (2014). Genetic variability and character association over environment in pearl millet [Pennisetum glaucum (L.) R. Br.] under dryland conditions of Gujarat. *Bioscan.*, **9**(2), 863-867.

Ezeaku, I., Angarawai, I., Aladele, S., Mohammed, S., and Science, C. (2015). Correlation, path coefficient analysis and heritability of grain yield components in pearl millet (Pennisetum glaucum (L.) R. Br.) parental lines. *J.plant breed.*, **7**(2), 55-60.

Izge, A., Kadams, A., and Gungula, D. (2006). Studies on character association and path analysis of certain quantitative characters among parental lines of pearl millet (Pennisetum glaucum) and their F1 hybrids in a diallel cross. *Afr. J. Agric. Res.*, **1**(5), 194-198.

Kumar R, S. H., M.S Dalal, V.Malik, Devvart L.K Chuch, P.Gargand and K.Raj. (2014). studies on variability, correlation and path analysis in pearl millet [Pennisetum glacum(L).R.BR] genotypes. *Forage Res.*, **40***(3)*, 163- 167.

Kumar, Y., Lamba, R., Yadav, H., Kumar, R., and Vart, D. (2014). Studies on variability and character association under rainfed conditions in pearl millet (Pennisetum glaucum L.) hybrids. *Forage Res.*, **39**(4), 175-178.

Manga, V. (2013). Research Note Components of genetic variance and interrelationship among quantitative traits in CAZRI-bred inbred restorers of pearl millet [Pennisetum glaucum (L.) R. Br.]. *Electron. J. Plant Breed.*, **4(**4), 1325-1330.

Mukh, R., Singh, S., Singh, P., Aradhana, S., and Parveen, S. (2014). Genetic variability analysis for yield and yield contributing traits in pearl-millet (Pennisetum glaucum L.). *Trends Biosci.*, ***7(***17), 2491-2495.

Ramya, K., Sumathi, P., and Joel, A. J. (2018). Research Note Genetic variability study in pearl millet germplasm (Pennisetum glaucum (L.) R. Br.) for yield and its component traits. *Electron. J. Plant Breed.*, ***9(***3), 1247-1252.

Sharma, B., Chugh, L. K., Sheoran, R. K., Singh, V. K., and Sood, M. (2018). Study on genetic variability, heritability and correlation in pearl millets germplasm. *J.Pharmacog. Phytochem.*, ***7(***6), 1983-1987.

Singh, O. V., and Singh, A. I. (2016). Analysis of genetic variability and correlation among traits in exotic germplasm of pearl millet [Pennisetum glaucum (L.) R. Br.]. *Indian J. Agric Res.*, **50(**1), 76-79.

Subbulakshmi, K., Ravikesavan, R., Babu, C., and Iyanar, K. (2018). Study of genetic variability in pearl millet [Pennisetum glaucum (L.) R. Br.] hybrids for grain yield and quality parameters. *Agricu. Sci. Dig.*, **38(**4).

Sudarshan Patil, K., Gupta, S., Dangi, K. S., Shashibhushan, D., Balram, M., and Ramesh, T. (2018). Panicle Traits and Plant Height are Important Selection Indices to Enhance Productivity in Pearl Millet (Pennisetum glaucum LR Br.) Populations. *Int.J.Curr.Microbiol.App.Sci.*, **7(**12), 306-312.

Sumathi, P., Madineni, S., and Veerabadhiran, P. (2010). Genetic variability for different biometrical traits in pearl millet genotypes (Pennisetum glaucum LR BR.). *Electron. j. Plant breed.*, **1(**4), 437-440.

Sumathi, P., and Revathi, S. (2017). Research Article Heterosis and variability studies for yield and yield components traits in pearl millet [Pennisetum glaucum (L.) R. Br.]. *Electron. J. Plant Breed.*, **8**(2), 528-533.

Talawar, A., Girish, G., Channabasavanna, A., and Kitturmath, M. (2017). Studies on genetic variability, correlation and path analysis in pearl millet (Pennisetum glaucum L.) germplasm lines. *Agricu. Sci. Dig.*, **37(**1).

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Table 1. Comparison of mean and range of maintainer and restorer lines of pearl millet

		Maintainer lines		Restorer lines	
		Mean	Range	Mean	Range
1	Days to 50% flowering(days)	45.262	40 – 54	47.588	42 – 58
2	Plant height(cm)	109.32	69.86 – 174.09	139.91	105.61 – 159.32
3	No of productive tillers	6.869	5 – 10.5	5	3 – 8
4	Leaf sheath length(cm)	10.38	9.11 – 11.88	11.90	9.62 – 13.92
5	Leaf blade length(cm)	36.86	26.12 – 53.93	54.92	40.32 – 71.70
6	Leaf blade width(cm)	3.595	2.7 – 4.75	3.73	3.03 – 5.07
7	Spike length(cm)	18.497	11.64 – 26.22	22.93	17.41 – 30.47
8	Spike girth(cm)	5.7	4 – 7.2	7.74	6.04 – 12.72
9	1000 grain weight(g)	9.66	5.50 – 17.5	14.77	10.46 – 18.00
10	Single plant yield (g)	95.15	46.20 – 129.15	104.40	52.15 – 151.44
11	Dry fodder ysield(g)	337.04	131.32– 659.65	339.38	130.50 – 599.00

Table 2. Mean, range, genetic parameters for eleven characters in maintainer and restorer lines of pearl millet

	Range	Mean	GCV	PCV	ECV	h^2 %(Broad Sense)	GA	GAM
Days to 50% flowering(days)	40 – 58	45.8305	7.933	8.333	2.551	90.6	7.130	15.558
Plant height(cm)	69.86 – 174.09	118.1398	21.042	21.121	1.833	99.2	51.015	43.182
Number of productive tillers	3 – 10.5	6.4661	17.566	24.116	16.523	53.1	1.704	26.359
Leaf sheath length(cm)	9.11 –13.92	10.8127	9.132	10.864	5.886	70.6	1.710	15.811
Leaf blade length(cm)	26.12 –71.70	42.0729	25.178	25.621	4.743	96.6	21.444	50.97
Leaf blade width(cm)	2.7 – 5.07	3.6102	12.415	13.021	3.923	90.9	0.880	24.387
Spike length(cm)	11.64 – 30.47	19.7720	17.314	18.310	5.955	89.4	6.669	33.729
Spike girth(cm)	4 – 12.7	6.2990	21.539	21.764	3.121	97.9	2.766	43.911
1000 seed wt(g)	5.50 – 18.00	11.1390	28.747	28.955	3.460	98.6	6.549	58.795
SPY(g)	46.20- 151.44	97.8161	22.042	24.909	11.602	78.3	39.303	40.18
DFY(g)	130.50 –659.65	337.7136	33.9630	41.969	13.815	89.2	260.331	77.088

SPY – Single plant yield, DFY – Dry fodder yield
GCV – Genotypic coefficient of variation, PCV – Phenoypic coefficient of variation, ECV – environmental coefficient of variation, GA – Genetic Advance, GAM – Genetic Advance as percentage of Mean

Table 3. Genotypic and phenotypic correlation for eleven characters in maintainer and restorer lines of pearl millet

TRAITS		D50%F	PH(cm)	NPT	LSL(cm)	LBL(cm)	LBW(cm)	SL(cm)	SG(cm)	1000seed wt(g)	DFY (g)	SPY(g)
D50%f	**rg**	**1.0000**	0.2182	-0.3003*	0.3925**	0.3522**	0.1614	0.2684*	0.4688**	0.3848**	-0.0403	0.0735
	rp	**1.0000**	0.2065	-0.1932	0.3408**	0.3296*	0.1483	0.2525	0.4379**	0.3625**	-0.0369	0.0673
PH(cm)	**rg**		**1.0000**	-0.0616	0.5975**	0.6365**	0.1569	0.6542**	0.4418**	0.5899**	-0.0912	0.4403**
	rp		**1.0000**	-0.0452**	0.4903**	0.6259**	0.1500	0.6145**	0.4348**	0.5857**	-0.0890	0.3858**
NPT(cm)	**rg**			**1.0000**	-0.3288*	-0.3485**	0.0159	-0.3116*	-0.3475**	-0.5537**	-0.0674	0.3233*
	rp			**1.0000**	-0.1328	-0.2613*	0.0287	-0.1970	-0.2638*	-0.3992**	-0.0045	0.2229
LSL(cm)	**rg**				**1.0000**	0.7609**	0.1566	0.6903**	0.4572**	0.7296**	0.1253	0.2556
	rp				**1.0000**	0.6324**	0.1475	0.5441**	0.3817**	0.6054**	0.1108	0.2169
LBL(cm)	**rg**					**1.0000**	0.1566	0.7215**	0.5662**	0.7102**	0.2540	0.2486
	rp					**1.0000**	0.1421	0.6728**	0.5527**	0.6943**	0.2341	0.2030
LBW(cm)	**rg**						**1.0000**	0.1854	0.3244*	0.1173	-0.0684	0.1829
	rp						**1.0000**	0.1535	0.3021*	0.1151	-0.0649	
SL(cm)	**rg**							**1.0000**	0.5245**	0.6633**	0.2949*	0.2182
	rp							**1.0000**	0.4928**	0.6223**	0.2540	0.1679
SG	**rg**								**1.0000**	0.5091**	0.0581	0.0285*
	rp								**1.0000**	0.5036**	0.0605	0.0394
1000 seed	**rg**									**1.0000**	0.1677	0.4697**
wt(g)	**rp**									**1.0000**	0.1570	0.4289
DFY (g)	**rg**										**1.0000**	0.0158
	rp										**1.0000**	0.0588

D 50% F – Days to 50% flowering, LSL – Leaf sheath length, LBL – Leaf blade length, LBW – Leaf blade width, SL – Spike length, SG – spike girth, NPT – Number of productive tillers/plant, PH – plant height, 1000 SW – 1000 Seed weight, DFY – Dry fodder yield, SPY – Single plant yield r_g - genotypic correlation coefficient r_p - phenotypic correlation coefficient

** - significant at 5% level and * - significant at 1% level

Table 4. Genotypic Path coefficient analyses for eleven characters in maintainer and restorer lines in pearl millet

	D50% F	PH	NPT	LSL	LBL	LBW	SL	SG	1000SW	DFY(g)
D50%F	**0.042**	0.009	-0.012	0.016	0.014	0.006	0.011	0.019	0.016	-0.001
PH(cm)	0.002	**0.009**	-0.000	0.005	0.006	0.001	0.006	0.004	0.005	-0.000
NPT	-0.253	-0.052	**0.844**	-0.277	-0.294	0.013	-0.263	-0.293	-0.467	-0.056
LSL (c)	-0.114	-0.174	0.096	**-0.292**	-0.222	-0.045	-0.201	-0.133	-0.213	-0.036
LBL(cm)	0.009	0.016	-0.008	0.019	**0.025**	0.004	0.018	0.014	0.018	0.006
LBW(cm)	0.022	0.021	0.002	0.021	0.021	**0.136**	0.025	0.044	0.016	-0.009
SL(cm)	-0.020	-0.050	0.024	-0.053	-0.055	-0.014	**-0.077**	-0.040	-0.051	-0.022
SG(cm)	-0.109	-0.102	0.080	-0.106	-0.131	-0.075	-0.122	**-0.232**	-0.118	-0.013
1000 SW(g)	0.492	0.755	-0.709	0.934	0.909	0.15	0.849	0.651	**1.280**	0.214
DFY(g)	0.003	0.008	0.006	-0.011	-0.024	0.006	-0.028	-0.005	-0.016	**-0.095**
SPY(g)	0.073	0.440	0.323	0.255	0.248	0.182	0.218	0.028	0.469	-0.015

D 50% F – Days to 50% flowering, LSL – Leaf sheath length, LBL – Leaf blade length, LBW – Leaf blade width, SL – Spike length, SG – spike girth, NPT – Number of productive tillers/plant, PH – plant height, 1000 SW – 1000 Seed weight, DFY – Dry fodder yield, SPY – Single plant yield

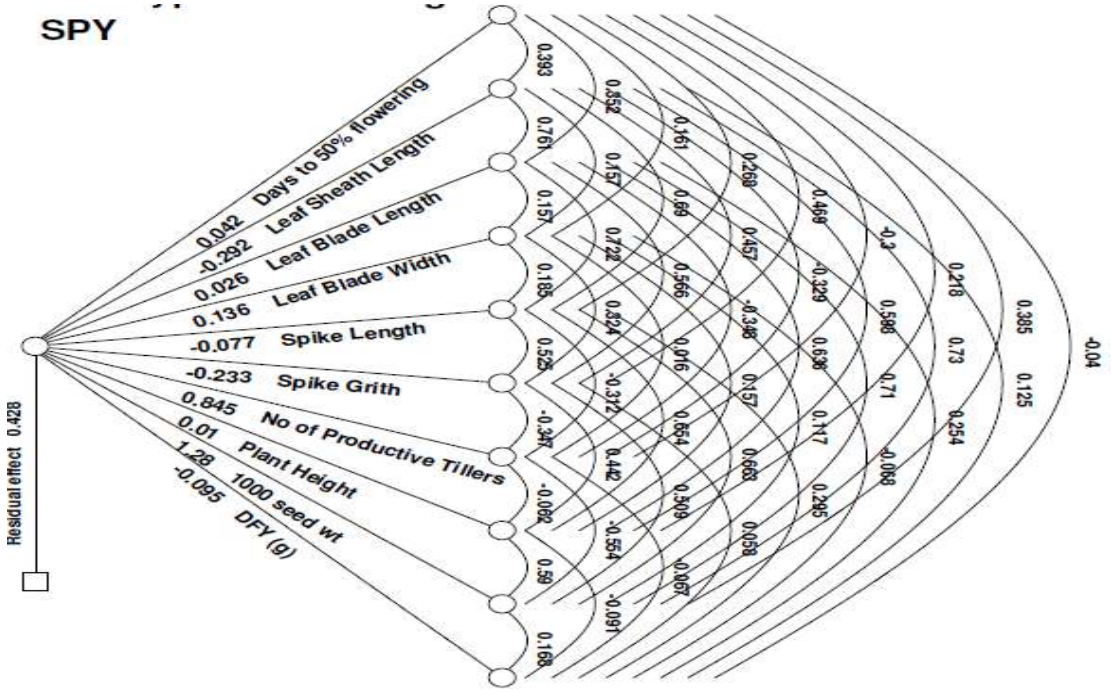

Fig. 1. Genotypic path diagram for single plant yield

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