Short Communication

Path coefficient analysis for protein content in grain amaranth (*Amaranthus hypochondriachus* L)

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ABSTRACT

A study conducted with twenty one diverse genotypes of grain amaranth indicated that grain yield/plant (0.546) exhibited highest positive direct effect on protein content followed by days to flowering (0.478), days to maturity (0.397), grain weight/panicle (0.388), plant height (0.377) and number of panicles/plant (0.294) whereas panicle width (-0.346), number of leaves/plant (-0.152),1000-seed weight (-0.096) and panicle length (-0.089) had negative but significant direct effect on protein content. Therefore the traits grain yield/plant, days to flowering, days to maturity, grain weight/panicle, plant height and number of panicles/plant could be selected for increasing protein content in grain amaranth.

Keywords: Path coefficient; genotypes; protein; yield components

INTERODUCTION

Grain amaranth is cultivated for grain purpose under different agro-climatic conditions. Its seed protein contains a balanced amino acid with high lysine content. The protein content varies among diverse genotypes and is also affected by various traits. Present study was undertaken considering this aspect.

MATERIAL and METHODS

Twenty one genotypes along with 3 checks viz BGA-2, GA-2 and CG Rajgira-1 were grown in RBD with three replications during rabi 2018-2019 at the farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. Each genotype was grown in plot size of 3 x 1.8 m. Five plants from each replication for each genotype were selected for studying the 11 traits (Table 1). Path analysis was worked out as per method of Dewey and Lu (1959) and protein was determined by adopting micro-Kjeldahl method outlined by Hawk et al (1954).

RESULTS and DISCUSSION

The data on path coefficient analysis was useful in permitting separation of correlation coefficients into direct and indirect effects and gave better picture of relationship between the pairs of traits (Table 1). Grain yield/plant (0.546) exhibited highest positive direct effect on protein content followed by days to flowering (0.478), days to maturity (0.397), grain weight/panicle (0.388), plant height (0.377) and number of panicles/plant (0.294) whereas panicle width (-0.346), number of leaves/plant (-0.152),1000-seed weight (-0.096) and panicle length (-0.089) had negative but significant direct effect on protein content. Days to flowering had maximum positive indirect effect on protein content via number of leaves/plant, days to maturity and panicle length; days to maturity via grain yield/plant, number of panicles/plant and panicle width; plant height via grain yield/plant, 1000-seed weight and number of panicles/plant; panicle length via grain yield/plant, number of panicles/plant, days to maturity,1000-seed weight, grain weight/panicle and plant height; panicle width via grain yield/plant, plant height, grain weight/panicle, numer of panicles/plant and number of leaves/plant; 1000-seed weight via grain yield/plant, number of panicles/plant, grain weight/panicle and days to flowering; grain weight via grain yield/plant, number of leaves/plant and number of panicles/plant; number of panicles/plant via grain yield/plant, days to maturity, grain weight/panicle, number of leaves/plant and plant; number of leaves/plant via days to maturity, panicle

Table 1. Genotypic path coefficient of various characters for protein content in grain amaranth

Character	Days to flowering	Days to maturity	Plant height (cm)	Panicle length (cm)	Panicle width (cm)	1000-seed weight (g)	Grain weight /panicle (g)	Number of panicles /plant	Number of leaves /plant	Grain yield/ plant (g)	Genotype 'r' with protein content
Days to flowering	**0.478**	0.023	-0.180	0.022	-0.013	-0.009	-0.077	-0.032	0.073	-0.201	0.082
Days to maturity	-0.227	**0.0397**	-0.090	-0.022	0.004	0.027	-0.048	0.045	-0.117	0.111	0.336*
Plant height (cm)	-0.228	-0.095	**0.377**	-0.001	-0.065	0.019	-0.019	0.008	-0.004	0.078	0.068
Panicle length (cm)	-0.121	0.101	0.005	**-0.089**	-0.161	-0.049	0.094	0.111	-0.069	0.236	0.059
Panicle width (cm)	0.018	-0.004	0.071	-0.041	**-0.346**	-0.032	0.052	0.051	0.025	0.402	0.197
1000-seed weight (g)	0.045	-0.114	-0.076	-0.045	-0.117	**-0.096**	0.109	0.138	0.009	0.159	0.011
Grain weight/panicle (g)	-0.095	-0.049	-0.019	-0.021	-0.046	-0.027	**0.388**	0.034	0.074	0.124	0.362**
Number of panicles/plant	-0.053	0.061	0.010	-0.033	-0.060	-0.045	0.045	**0.294**	0.021	0.167	0.408**
Number of leaves/plant	-0.229	0.304	0.011	-0.040	0.059	0.005	-0.189	-0.042	**-0.152**	0.039	-0.231
Grain yield/plant (g)	-0.176	0.081	0.054	-0.038	-0.225	-0.028	0.088	0.090	-0.011	**0.546**	0.351**

Residual effect (R)= 0.388, *Significant at 5% level of significance, **Significant at 1% level of significance, Diagonal bold values show direct effect

width, grain yield/plant, plant height and 1000-seed weight and grain yield/plant via number of panicles/plant, grain weight/panicle, days to maturity and plant height. Rest of the traits showed negative indirect effect on protein content.

REFERENCES

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