

Short Communication

Path analysis in potential underutilized pseudo-cereal grain amaranth (*Amaranthus hypochondriacus* L)

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ABSTRACT

A study on 27 genotypes of grain amaranth indicated that petiole length showed highest positive direct effect on seed yield per plant followed by days to 50 per cent flowering, plant height, seed volume, number of primary branches per plant and stem thickness. Therefore, these characters could be selected for increasing seed yield in grain amaranth. Other characters showed negative but significant direct effects on seed yield per plant like days to maturity, leaf length, number of leaves per plant, number of panicles per plant and inflorescence length.

Keywords: Grain amaranth; characters; genotypes; path analysis

INTRODUCTION

Grain amaranth (*Amaranthus hypochondriacus* L) is a rich-protein, monoecious inflorescence crop. Its flour helps in preventing certain diseases like heart attack, diabetes, brain stroke etc and in making biscuits, cakes, Laddoos, pasta, chapatti etc. The seeds contain balanced amino acids with high lysine content than other cereals (Yadav 2018). A study was conducted on grain amaranth to see the direct and indirect effects among important traits in genotypes by adopting path coefficient analysis.

MATERIAL and METHODS

A set of 27 genotypes of grain amaranth was obtained from All India Coordinated Research Network on Potential Crops, ICAR – National Bureau of Plant Genetic Resources, New Delhi.

These genotypes were raised in randomized block design with three replications during 2021-2022 at the experimental farm of the Department of Genetics and Plant Breeding, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. Each genotype was grown in plot size of 3.0 m x 1.8 m. Recommended package of practices was adopted to raise the crop.

Observations were recorded on 5 randomly selected plants from each replication from each plot. Path coefficient analysis was computed as per Dewey and Lu (1959).

RESULTS and DISCUSSION

With a view to study the direct (diagonal) and indirect effects of characters of grain yield per plant, the path coefficient analysis was undertaken at genotypic level (Table 1). Petiole length (1.873) showed the maximum positive direct effects on seed yield per plant followed by days to 50 per cent flowering (1.304), plant height (0.795), seed volume (0.582), number of primary branches per plant (0.400) and stem thickness (0.084).

Similar findings were reported by Yadav (2018) for seed volume and Yadav (2021) for days to 50 per cent flowering and plant height in grain amaranth. Remaining characters exhibited low, positive and negative direct and indirect effects on seed yield per plant.

Days to maturity (−1.657), leaf length (−1.606), number of leaves per plant (−1.281), number of panicles per plant (−0.404) and inflorescence length (−0.038)

Table 1. Genotypic path analysis for seed yield components in grain amaranth

Character	Days to 50% flowering	Days to maturity	Plant height (cm)	Stem thickness (cm)	Number of panicles /plant	Number of leaves /plant	Number of primary branches/plant
	1	2	3	4	5	6	7
1	1.304	-0.940	0.216	0.037	-0.052	-0.395	0.051
2	0.740	-1.657	0.364	0.006	0.030	0.104	-0.038
3	0.353	-0.758	0.795	0.025	-0.072	-0.522	0.108
4	0.578	-0.124	0.241	0.084	-0.155	-0.684	0.071
5	0.167	0.122	0.142	0.032	-0.404	-0.185	0.090
6	0.402	0.135	0.324	0.045	-0.058	-1.281	0.156
7	0.166	0.159	0.215	0.015	-0.092	-0.501	0.400
8	0.307	-0.422	0.505	0.042	-0.108	-0.669	-0.001
9	-0.129	0.179	3.315	0.020	-0.134	-0.189	0.063
10	-0.210	1.177	0.152	0.030	-0.038	-0.533	0.108
11	-0.697	1.517	-0.230	-0.008	-0.085	0.460	-0.019
12	-0.374	0.222	-0.007	-0.033	-0.020	0.101	0.072

Table 1. Contd.....

Character	Petiole length (cm)	Leaf length (cm)	Inflorescence length (cm)	Inflorescence width (cm)	Seed volume (g/10 ml)	Genotypic Correlation 'r'
	8	9	10	11	12	
1	0.440	0.158	0.006	-0.771	-0.167	-0.113
2	0.477	0.174	0.004	-0.450	-0.078	0.324**
3	1.189	-0.637	-0.007	-0.416	0.005	0.054
4	0.942	-0.387	-0.013	-0.138	-0.231	0.186
5	0.500	-0.533	-0.004	0.304	0.029	0.261*
6	0.978	-0.238	-0.016	-0.518	-0.046	-0.117
7	-0.003	-0.255	-0.010	-0.070	0.105	0.130
8	1.873	-1.117	-0.016	0.309	-0.059	-0.033
9	1.371	-1.606	-0.022	0.496	0.016	0.379**
10	0.805	-0.929	-0.038	0.604	-0.060	0.069
11	-0.401	-0.550	-0.016	1.441	-0.075	0.337**
12	-0.191	-0.044	0.004	-0.186	0.582	0.125

*Significant at 5% LoS, **Significant at 1% LoS; Residual value = 5.569

had negative but significant direct effects on seed yield per plant.

These results are in line with the findings of Yadav (2021) for number of leaves per plant and panicle length in grain amaranth.

Therefore, the characters like days to 50 per cent flowering, plant height, seed volume, number of primary branches per plant and stem thickness could be selected for achieving higher seed yield in grain amaranth in future breeding programmes.

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