**RESEARCH PAPER** International Journal of Agricultural Sciences, June to December, 2009, Vol. 5 Issue 2 : 337-339

# Diallel analysis in grain amaranth (*Amaranthus* spp.)

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#### ABSTRACT

A study involving 45 hybrids using 10-parent diallel excluding reciprocal for combining ability analysis in grain amaranth revealed higher magnitude of sca variance over gca variance for all the traits which indicated preponderance of non additive gene action. The parents GA-1, GA-2 and SKNA-7-1 were good general combiners for seed yield per plant and its five or more component traits. Eight out of 45 hybrids showed significant positive sca effects seed yield per plant and component traits.

Key words : Amaranth, Combining ability, Grain amaranth diallel and Yield attributing traits

#### INTRODUCTION

Grain amaranth has been reported to be more nutritive than common food grains. Recently this crop has gained lot of importance in the plains of India, especially in parts of Gujarat and Maharastra, whereit is known as "Rajgirah". In Gujarat, people who observe fast on Ekadasi or during other festivals prefer sweets prepared from amaranth grain, sugar and ghee popularly known as "seera". The information about combining ability is of immense help to the plant breeder in the choice of suitable parents for hybridization programme. The nature of gene action has a bearing on development of efficient breeding programme. Looking to the importance of crop and necessity of understanding of combining ability of parents and nature of gene effects of yield and its components, present study was undertaken on diallel analysis in grain amaranth.

### **MATERIALS AND METHODS**

Ten diverse genotypes of grain amaranth (*Amaranthus spp.*) were crossed 10 x 10 diallel fashions excluding reciprocals. The resulting  $F_1$ s along with their ten parents were sown in three replication in randomized

block design (RBD) during rabi 2004-05 at All India cocoordinated Research Project on Under Utilized crops, Regional Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. Each genotype was sown in 3m long single row keeping spacing of 45cm between plants and within rows, respectively. The observations were recorded on five competitive plants selected randomly in each genotype in each replication for seed yield per plant (g) and its component traits like, days to 50 per cent flowering, days to 80 per cent maturity, plant height (cm), earhead length(cm), number of fingers per ear head, number of branches per plant, finger length(cm), straw yield per plant (g), 1000-seed weight (g), harvest index (%) and protein content (%). Data were subjected to combining ability analysis following Griffing's (1956) Method-2, Model-I (fixed model).

## **RESULTS AND DISCUSSION**

The results of analysis of variance for different characters are presented in Table 1. It revealed that mean squares due to gca were significant for all the traits except 1000-seed weight and protein content and mean squares due to sca were significant for all the traits except for

Table 1 :	Table 1 : Analysis of variance for combining ability estimates of components of variance and their ratios for different characters in grain amaranths														
Source of variation	of n	D.f.	Days to 50% flowering	Days to 80% maturity	Plant height (cm)	Earhead length (cm)	No. of finger per earhead	Finger length (cm)	No. of branches per plant	Seed yield per plant (g)	Straw yield per plant (g)	1000-seed weight (g)	Harvest index (%)	Protein content (%)	
GCA		9	184.49**	239.69**	3426.72**	482.28**	1272.23**	87.96**	17.60**	131.07**	442.00**	0.0019	77.25**	1.356	
SCA		45	13.14**	19.58**	207.74**	37.93**	86.69**	8.27**	1.23	7.17**	62.67**	0.0037	6.03**	0.208	
Error		108	0.333	1.328	14.811	4.13	8.94	1.50	0.04	1.540	8.645	0.000021	1.610	0.178	
<sup>2</sup> gca			0.025	0.099	1.110	0.300	0.67	0.11	0.003	0.110	0.640	0.0000016	0.120	0.013	
<sup>2</sup> sca			0.280	1.120	12.560	3.500	7.58	0.26	0.031	1.300	7.33	0.000018	1.36	0.15	
$^2$ gca/ $^2$ s	sca		0.089	0.088	0.088	0.085	0.088	0.084	0.087	0.084	0.087	0.088	0.088	0.086	
* and ** i	indi	cates	significand	ce of value	es at P=0.05	and P=0	01 respecti	velv							

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