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Correlation coefficient analysis for yield and it's components in sesame (*Sesamum indicum* L.)

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Abstracts
An experiment was conducted at Research Farm, RVSKVV, College of Agriculture, Gwalior (M. P.). In *kharif* season 2015 eight parents and 28 F_1 hybrids were grown in RBD with 3 replications for evaluation of yield and yield attributing traits. Five plants from each parent and hybrid were selected randomly for collection of data of different yield contributing characters such as days to peak flowering, days to maturity, plant height, number of primary branches per plant, number of capsules on main axis, total number of capsules per plant, number of seeds per capsule, capsule length, 1000 seed weight and seed yield per plant. The characters number of primary branches per plant, number of capsules on main axis, total number of capsules per plant and 1000 seed weight showed highly significant positive association with seed yield per plant in for both the generations whereas, number of seeds per capsule and capsule length exhibited significant positive correlation with seed yield per plant in F_1 hybrids only. Days to peak flowering and days to maturity showed significantly negative correlation with seed yield per plant for parental population only. According to this study it could be concluded that total number of capsules per plant, number of capsules on main axis, number of primary branches per plant and 1000 seed weight for improvement in yield and days to peak flowering and days to maturity for earliness are promising good selection criteria in sesame.

Keywords: Correlation coefficient analysis, Diallel, *Sesamum indicum* L.

Introduction
Sesame (*Sesamum indicum* L.) is an important oilseed crop belongs to the family Pedaliaceae and it is diploid (2n=26) in nature. It is cultivated in around 60-65 countries of the world, while Asian and African countries are the major producers. Asia is rich in diversity of cultivated types while Africa is prosperous in wild varieties. Due to the presence of diverse wild species **"**Ethiopia" (Africa) is considered as the primary centre of origin, while India and Japan are considered as the two secondary centres of origin of this crop. Sesame is diploid (2n=26) in nature and is commonly known as Til, Tilli, Gingelly, Ellu, Sim-sim, Benni Seed, Nurvulu, Vellvor Rasi and sesame in different part of the India and often referred as the epithet "the queen of oilseeds". Generally the oil content in sesame ranges from 34 to 63 per cent (Sharma *et al*. 2014) [7].

Yield is a very complex character and improvement in this character is not possible by selecting for yield alone, correlation coefficient is very helpful to know the relationship of yield with other character and relationship among the characters which played their role to increase yield. Hence, the present investigation was carried out to get information on character association in 8 parents and 28 hybrids of sesame for ten characters.

Material and methods
Experiment was conducted at Research Farm, RVSKVV, College of Agriculture, Gwalior (M. P.). In *kharif* season 2014 eight parents were grown (received from College of Agriculture, Tikamgarh JNKVV Jabalpur, Madhya Pradesh) for making half diallel crosses [n (n-1)/2] among them and then next year in *kharif* season 2015 eight parents and 28 F_1 hybrids were grown in RBD with 3 replications for evaluation of yield and yield attributing traits. Five plants from each parent and hybrid were selected randomly for collection of data of different yield contributing characters such as days to peak flowering, days to maturity, plant height, number of primary branches per plant, number of capsules on main axis, total number of capsules per plant, number of seeds per capsule, capsule length, 1000 seed weight and seed yield per plant. Genotypic and phenotypic correlation coefficients were worked out between

characters as suggested by Al-Jibouri *et al*. (1958) [1]. Cultural practices were conducted during the growing season according to the recommended package of technology.

Results and discussion

Estimation of genotypic and phenotypic correlation coefficient between pairs of seventeen characters in 8 parents and 28 F_1 generation of sesame are presented in table 1. In general the estimates of genotypic and phenotypic correlations were in agreement both in sign and magnitude, but the former were slightly higher than latter.

Table 1: Genotypic (below diagonal) and phenotypic (above diagonal) correlation coefficient for yield and its components in sesame genotypes (8 parents & 28 F_1 Hybrids)

Characters		Days to peak flowering	Days to maturity	plant height (cm)	No. of primary branches per plant	No. of capsules on main axis	Total No. of Capsules per Plant	No. of seeds Per Capsule	Capsule length (cm)	1000 Seed Weight (g)	Seed Yield Per Plant (g)
Days to peak flowering	P	1.000	0.755***	0.203	-0.162	-0.711***	-0.654***	-0.164	-0.690***	-0.332	-0.690***
	F_1	1.000	0.575***	0.150	-0.125	-0.132	-0.220*	0.068	-0.027	-0.116	-0.137
Days to maturity	P	0.844	1.000	0.237	0.268	-0.792***	-0.403	-0.020	-0.533**	-0.325	-0.441*
	F_1	0.636	1.000	0.232*	0.125	-0.062	-0.134	0.022	0.029	-0.166	-0.140
plant height (cm)	P	0.211	0.249	1.000	-0.009	-0.150	-0.066	0.446*	-0.209	-0.253	-0.103
	F_1	0.151	0.251	1.000	-0.083	0.046	-0.069	0.111	-0.272**	-0.188*	-0.168
No. of primary branches per plant	P	-0.170	0.252	-0.038	1.000	-0.004	0.690***	-0.120	-0.021	0.341	0.657***
	F_1	-0.173	0.128	-0.114	1.000	0.161	0.563***	-0.114	0.049	0.091	0.368***
No. of capsules on main axis	P	-0.747	-0.899	-0.177	0.008	1.000	0.710***	0.256	0.542**	0.189	0.657***
	F_1	-0.156	-0.067	0.036	0.190	1.000	0.584***	0.202*	0.238*	0.212*	0.590***
Total No. of capsules per Plant	P	-0.685	-0.489	-0.099	0.684	0.733	1.000	0.115	0.390	0.385	0.947***
	F_1	-0.232	-0.156	-0.078	0.612	0.608	1.000	0.173	0.327***	0.235*	0.833***
No. of seeds Per Capsule	P	-0.168	-0.019	0.451	-0.126	0.268	0.123	1.000	0.553**	-0.697***	-0.008
	F_1	0.073	0.026	0.113	-0.142	0.208	0.177	1.000	0.218*	-0.284**	0.331***
Capsule length (cm)	P	-0.776	-0.628	-0.254	-0.112	0.679	0.409	0.634	1.000	-0.173***	0.346
	F_1	-0.040	0.024	-0.285	0.079	0.247	0.352	0.226	1.000	0.109	0.374***
1000 Seed Weight (g)	P	-0.382	-0.410	-0.284	0.372	0.221	0.437	-0.756	-0.188	1.000	0.604**
	F_1	-0.1308	-0.191	-0.1956	0.1419	0.237	0.2526	-0.2826	0.1234	1.000	0.580***
Seed Yield Per Plant (g)	P	-0.740	-0.537	-0.131	0.662	0.698	0.975	-0.006	0.395	0.588	1.000
	F_1	-0.150	-0.160	-0.177	0.418	0.618	0.847	0.344	0.402	0.572	1.000

Correlation between seed yield per plant and other characters

The characters number of primary branches per plant, number of capsules on main axis, total number of capsules per plant and 1000 seed weight showed highly significant positive association with seed yield per plant in for both the generations. Khan *et al.* 2001 also reported highly significant correlation of number of branches per plant, number of capsules per plant and 1000 seed weight. Teklu *et al.* 2017 [9] reported significant positive association of number of primary branches per plant whereas, significant negative association of number of capsules per plant with seed yield per hectare. Lalpantluangi and Shah 2018 [5] reported significant positive correlation of capsules per plant with seed yield per plant. Sikarwar 2002 [8] reported number of branches per plant, number of capsules on main branch, number of capsules on secondary branch, total number of capsules per plant and 1000 seed weight significantly positive correlated with seed yield per plant in parents, hybrids and F_2 generations. Significantly negative correlation with seed yield per plant was found with days to peak flowering and days to maturity for parental population. Significant negative correlation of days to 50% flowering with seed yield per plant was also reported by Yol *et al.* 2010. Teklu *et al.* 2017 [9, 11] reported correlation of days to maturity was significant negative with seed yield per hectare. Significant positive correlation of days to maturity with seed yield per plant was also reported by Sikarwar 2002 [8] and Lal *et al.* 2016 [4]. Number of seeds per capsule and capsule length exhibited significantly positive association with seed yield per plant in F_1 hybrids only. Similar findings were also reported by Sikarwar 2002 [8], Parmeshwarappa *et al.* 2009 and Teklu *et al.* 2017 [9].

Inter Correlation among the characters

The results revealed that the character days to peak flowering exhibited significantly positive association with days to maturity whereas, significantly negative association with total number of capsules per plant in both the generations. This trait showed highly significant and negative association with number of capsules on main axis and capsule length in parental population only. This results in the harmony with Teklu *et al.* 2017 [9] and Lalpantluangi and Shah 2018 [5]. Days to maturity showed highly significant and negative association with number of capsules on main axis and capsule length in parental population. For F_1 hybrids significant positive correlation was found with plant height only. Teklu *et al.* 2017 [9] also reported days to maturity showed significant positive correlation with plant height and significant negative correlation with capsule length. Number of primary branches per plant showed highly significant and positive correlation with total number of capsules per plant in both the generations. Similar findings have earlier reported by Sikarwar 2002 and Daniya *et al*. 2013 [8, 2]. The trait number of capsules on main axis exhibited significant and positive correlation with total number of capsules per plant and capsule length for both parents and hybrids. Significant positive correlation of this trait was found with number of seeds per capsule and 1000 seed weight for hybrids only. Such trends were also reported by Sikarwar 2002 and Lal *et al* 2016 [8, 4]. For the character total number of capsules per plant significant positive correlation was found with capsule length and 1000 seed weight in hybrid population whereas, parental population showed positive but non-significant correlation with the same traits. Parmeshwarappa *et al.* 2009 and Daniya *et al.* 2013 [2] reported number of capsules per plant significantly and positively correlated with capsule length.

Yol *et al.* 2010 [11] reported significant positive association between number of capsules and 1000 seed weight. Number of seeds per capsule showed significantly positive correlation with capsule length while, significantly negative correlation with 1000 seed weight in both the generations. Significant positive association between capsule length and number of seeds per capsule was also reported by Yol *et al*. 2010 [11]. Vanishree *et al.* 2011 reported number of seeds per capsule was significantly and positively correlated with 1000 seed weight. Capsule length showed highly significant and negative association with 1000 seed weight in parental population only. Negative association of capsule length with 1000 seed weight were also reported by some workers *viz*. Lal *et al.* 2016 and Lalpantluangi and Shah 2018 [5, 4].

Conclusions

The conclusions were drawn from the study of genotypic and phenotypic correlation coefficient; to increase seed yield per plant, selection should be made for total number of capsules per plant, number of capsules on main axis, number of primary branches per plant and 1000 seed weight. Days to peak flowering and days to maturity may be considered as efficient alternate criteria of selection for selecting early maturing genotypes in sesame.

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