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Correlation studies in land races of *kharif* sorghum (*Sorghum bicolor* (L.) Moench)

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Abstract
Fifty-five landraces of *kharif* sorghum were evaluated and correlation coefficient were estimated for the grain yield and the yield contributing traits including the grain mold rating. Correlation studies revealed that the plant height exhibited positive significant association with fodder yield per plant indicating the role of plant height in increasing the fodder yield. The seed hardness showed positive significant genotypic correlation with germination percentage of seed indicating the importance of seed hardness in improving the germination percentage of seed. Threshed grain mold rating recorded negative significant correlation with germination percentage indicating that higher grain mold infestation is responsible for reducing the germination percentage of seed. Specific gravity of seed exhibited positive and highly significant association with 1000 seed weight thereby indicating the role of specific gravity in development of bold seeded genotypes in sorghum. Germination percentage of seed exhibited highly significant and positive association with vigour index of seed.

Keywords: genotypic correlation, sorghum

Introduction
The grain yield levels of *kharif* sorghum hybrids have reached the plateau and there is need to exploit the unused germplasm and the land races to diversify the genetic base of *kharif* sorghum. The land races are the varieties nurtured and cultivated by the farmers though traditional method of selection by over the decades. The land race is a primitive cultivar grown by the farmers and their successors since ancient times. These land races are store houses of the genetic variability and ordinarily are adapted to local soil types, climatic conditions etc. They are sources of many valuable genes including those for adaptation. So, there is need to conserve and study the characteristic of land races and their further utilization in the breeding programme. The challenge to sorghum improvement will be to concentrate on utilization of desirable traits from such land races that may aid in developing the improved lines aiming to surpass the present productivity plateau combined with better drought, disease and pest resistance along with improved grain quality.
The intensity of association of characters is determined by correlation studies. Such correlation studies help us to know which character should be chosen for selection to bring about the maximum increase in the ultimate product. So, investigation was carried out to assess the nature and the extent of correlation between yield and the yield contributing characters including the grain mold rating.

Material and Methods
Fifty-five land races of *kharif* sorghum comprising of 40 hybrids of *kharif* sorghum developed by crossing 4 lines and 10 testers in line × tester fashion along with one check CSH-35. The seed parental lines was provided by Sorghum research unit, Dr. PDKV, Akola The crossing program was carried out at the Sorghum Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (MS) during rabi 2019-2020. Experiment was conducted during *kharif* 2020-2021. Material was sown in randomized block design with 3 replcations. Observations were recorded on the eleven characters like days to fifty percent flowering, plant height(cm), seed hardness(kg/cm^2), threshed grain mold rating (%), specific gravity of seed(g/ml), germination of percentage of seed, vigour index of seed, electrical conductivity(dsm^{-1}), 1000 seed weight(g), fodder yield per plant(g) and grain yield per plant(g). Genotypic correlation coefficients were worked out as per the formulae suggested by Dewey and Lu (1959) [2].

Results and Discussion

The results presented in Table 1 showed that grain yield per plant showed positive highly significance association with fodder yield per plant (0.938**), germination percentage of seed (0.928**), plant height (0.867**), 1000 seed weight (0.862**), vigour index (0.857**), seed hardness (0.778**), specific gravity (0.776**) and days to 50 % flowering (0.663**). For fodder yield and 1000 seed weight similar result obtained by Goswami *et al*. (2020) [5]. Kathalkar (2017) [8] reported that grain yield per plant showed positive and significant association with vigour index, germination percentage of seed, specific gravity, seed hardness and plant height.

Days to 50 % flowering showed positive and highly significant association with 1000 seed weight (0.795**), germination percentage (0.782**), vigour index (0.769**), specific gravity (0.688**), fodder yield per plant (0.683**), seed hardness (0.618**) and plant height (0.548**). Similar results were obtained by Godbharle *et al.* (2010) [4] Jain and Patel (2012) [7] for days to 50% flowering and fodder yield per plant. Deepalaxmi *et al*. (2007) [1] reported positive correlation between days to 50% flowering and plant height. For specific gravity similar result recorded by Kathalkar (2017) [8]. Thus, selection for days to 50% flowering will be helpful for improvement of plant height and subsequently increased fodder yield also. Negative correlation is desirable for this trait as less number of days to flower reduces the crop duration and useful for development of short duration varieties. Character like threshed grain mold rating (-0.701**) showed negative and significant association with days to 50% flowering. Rathod (2005) [10] reported similar results for days to 50% flowering with threshed grain mold rating. Days to 50% flowering and threshed grain mold rating showed negative significant association indicating that late flowering lines tendered to escape grain mold damage.

The plant height exhibited positive and highly significant association with fodder yield per plant (0.939**), germination percentage of seed (0.876**), vigour index (0.860**), seed hardness (0.733**), 1000 seed weight (0.707**) and specific gravity (0.654**). Jain *et al*. (2009) [6] observed similar correlation between plant height and fodder yield. Mahajan *et al*. (2011) [9] reported similar correlation between plant height and 100 seed weight. For vigour index and seed hardness similar result obtained by kathalkar (2017) [8]. Thus selection of plant height will be helpful in simultaneous improvement of for fodder yield per plant and it can be very well exploited for development of high fodder yielding varieties.

Seed hardness showed positive and highly significant association with germination percentage of seed (0.825**), vigour index of seed (0.801**), 1000 seed weight (0.784**), fodder yield per plant (0.715**) and specific gravity (0.689**). Similar results were found by Rathod (2005) [10] for seed hardness and germination percentage of seed. Kathalkar (2017) [8] recorded similar result for vigour index, 1000 seed weight and fodder yield per plant. Thus selection of seed hardness will be helpful in simultaneous improvement of germination percentage of seed and vigour index of seed.

Grain mold is the major disease of *kharif* sorghum. If the sorghum crop at flowering and post flowering stage is exposed to the long period of high humidity then there is development of some saprophytic fungi on the developing grain of sorghum. This fungal growth causes the blackening of the sorghum grain, reduction in the germination percentage of seed, reduction in the acceptability and the market prize also. The intensity of this disease is measured in terms of threshed grain mold rating. For threshed grain mold rating negative correlation is desirable. The characters germination percentage of seed (-0.863**), vigour index of seed (-0.810**), fodder yield per plant (-0.783**), 1000 seed weight (-0.801**) and specific gravity (-0.735**) exhibited negative and significant association with threshed grain mold rating (TGMR), which suggested that improvement in these characters may reduce the grain mold infestation. Rathod (2005) [10] reported negative association between TGMR and germination percentage of seed.

Specific gravity of seed exhibited positive and highly significant correlation with germination of seed (0.855**), 1000 seed weight (0.767**), vigour index (0.762**) and fodder yield per plant (0.734**). Thus selection of specific gravity will be helpful for development of bold seeded varieties.

Germination percentage of seed exhibited positive and highly significant association with 1000 seed weight (0.962**), vigour index of seed (0.947**) and fodder yield per plant (0.915**). Thus selection of 1000 seed weight of seed will be helpful in simultaneous improvement of germination percentage of seed and vigour index of seed.

Vigour index of seed exhibited positive and highly significant association with fodder yield (0.908**) and 1000 seed weight (0.860**).

Electrical conductivity exhibited negative and significant association with 1000 seed weight (-0.838**) and fodder yield (-0.743**). Similar results were obtained by Ghorade *et al.* (2014). One thousand seed weight exhibited positive and highly significant association with fodder yield per plant (0.813**). The results are in conformity with Godbharle *et al*. (2010) [4].

Thus it was concluded from the present study that plant height had positive and highly significant correlation with fodder yield. So, due importance should be given to plant height in developing high fodder yielding varieties. Similarly seed hardness should be taken in to consideration for improvement in germination percentage due to their positive and significant association with each other. Threshed grain mold rating recorded negative significant correlation with germination percentage indicating that higher grain mold infestation is responsible for reducing the germination percentage of seed. Specific gravity of seed exhibited positive and highly significant association with germination percentage of seed and 1000 seed weight there by indicating the role of specific gravity in development of bold seeded genotypes in sorghum.

Table 1: Genotypic correlation coefficients between grain yield and yield contributing characters

Characters	Plant height (cm)	Seed hardness (kg/cm^2)	Threshed grain mold rating (%)	Specific gravity of seed (g/ml)	Germination % of seed	Vigour index of seed	Electrical conductivity (dsm^{-1})	1000 seed weight (g)	Fodder yield per plant (g)	Grain yield per plant (g)
Days to 50% flowering	0.548**	0.618**	-0.701**	0.688**	0.782**	0.769**	0.728**	0.795**	0.683**	0.663**
Plant height		0.733**	-0.724**	0.654**	0.876**	0.860**	-0.592**	0.707**	0.939**	0.867**
Seed hardness			-0.917**	0.689**	0.825**	0.801**	-0.831**	0.784**	0.715**	0.778**
Threshed grain mold rating				-0.735**	-0.863**	-0.810**	0.864**	-0.801**	- 0.783**	0.805**
Specific gravity of seed					0.855**	0.762**	-0.751**	0.767**	0.734**	0.776**
Germination % of seed						0.947**	-0.909**	0.962**	0.915**	0.928**
Vigour index of seed							-0.796**	0.860**	0.908**	0.857**
Electrical conductivity								-0838**	-0.743**	-0836**
1000 seed weight									0.813**	0.862**
Fodder per plant yield										0.938**

*Significant at 5% ** Significant at 1%

References

1. Deepalaxmi AJ, Ganeshmurthy K. Studies on variability and character association in kharif sorghum. Indian j Agric. Res and. 2007;41(3):177-182.
2. Dewey OR, Lu KU. A correlation and path coefficient analysis of components of crested wheat seed production. Agron J. 1959;57:515-518.
3. Ghorade RB, Kalpande VV, Bhongle SA, Bhakre RL. Interrelationship among the parameters associated with grain mold resistance in kharif sorghum. Plant Archeives 2014;14(1):487-489.
4. Godbharle AR, More AW, Ambekar SS. Genetic variability and correlation studies in elite 'B' and 'R' lines in *kharif* sorghum. Electronic Journal of Plant Breading. 2010;1(4):989-993.
5. Goswami SJ, Patel PT, Gami RA, Patel RN, Khatri AB. Correlation and path analysis study of different characters for grain yield and fodder purpose sorghum (*Sorghum bicolar* (L.) Moench) Electronic Journal of Plant Breeding. 2020;11(4):1053-1061.
6. Jain SK, Elangovan M, Patel NV. Genetic and environmental variability in dual sorghum, for yield and related traits, Forage Res. 2009;34(4):201-204.
7. Jain SK, Patel PR. Genetic variability in land races of forage sorghum (*Sorghum bicolor* (L.) Moench) collected from different geographical origin of India. International Journal of Agric. Sci. 2012;4(2):182-185.
8. Kathalkar PB. Assement of seed quality, growth parameters and yield in kharif sorghum (*Sorghum bicolor* (L.) Moench) M.sc (unpub.) Dr. PDKV, Alola, 2017.
9. Mahajan RC, Wadikar PB, Pole SP, Dhuppe MV. Variability, correlation and path analysis studies in sorghum. Research Journal of Agricultural Science. 2011;2(1):101-103.
10. Rathod ST. Evaluation of grain mold tolerant derived sorghum genotypes. M.Sc. Thesis (Unpub.) Dr. PDKV, Akola, 2005.