Scientist|X89X367X|7.72|Published by LMG|
https://www.thescientist.online/

CORRELATION AND PATH COEFFICIENT ANALYSIS IN ONION *(ALLIUM CEPA* L.*)* GERMPLASM UNDER WESTERN UTTAR PRADESH CONDITIONS

*Satya Prakash, Bijendra Singh, Arvind Kumar, Pankaj Kumar, Mukesh Kumar, Jagraj singh, Amit Kumar & Mohit Kumar

Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut (UP)-250110

ABSTRACT

The present investigation was carried out at Horticulture Research Centre (HRC) of SVPUAT, Meerut, U.P, 2020-21 and 2021-22, to study the correlation and path coefficient analysis among 10 germplasm of Onion (*Allium cepa* .L) genotypes based on morphological characters. The experiment was laid down in randomized block design (RBD) with three replications. Analysis of variance for 10 genotypes of Onion revealed significant difference for all the 9 parameters, which indicated the presence of wide spectrum of variability among the genotypes. The phenotypic coefficient of variation (PCV) was higher than the respective genotypic coefficient of variation (GCV) for all the traits. High heritability and genetic advance as per cent of mean were observed for all nine characters. The highest heritability was recorded in Yield per ha (98.07%) and lowest for Bulb Diameter (71.66%). Correlation coefficient studies indicated that genotypic correlation coefficient was found to be higher than phenotypic correlation coefficients for most of the characters, indicating a strong inherent association between various characters and due to which it is affected by environmental components in regard to phenotypic expression. Yield per (q) ha expressed highly significant and positive correlation with seed yield per plot (kg) Path coefficient analysis revealed that highest positive direct effect on yield per ha (q), was observed for yield per plot per (kg), height of the plant (cm),fresh bulb wight (gm), bulb diameter(cm) and no. of leaf plant observed very high which indicates that these characters play the significant role to increase the yield per ha(q).High but negative direct effect exhibited by leaf length ,dry bulb weight and duration of crop(days) on yield kg per ha (q) at genotypic level, therefore these characters may be selected for onion crop improvement.

KEY WORDS – Correlation and Path coefficient, Germplasm, Onion

CONCLUSION

Mean performance values showed that all the characters have significant difference for all the nine characters of ten genotypes of Onion. As the value of mean performance changes, it may lay direct impact on yield per ha (q) and yield will also change. Phenotypic coefficient of variance (PCV) was higher than the genotypic coefficient (GCV) of variation for all traits indicating that environmental factor influencing their expression and their susceptibility to environmental fluctuations. Variability studies suggest that all the characters revealed that direct selection is more effective to improve all the character Agri-found Light Red had highest mean performance for the different characters such as Number of Leaves /plants, Height of the Plant (cm), and Leaf Length (cm) these are significantly differed with the other varieties. Whereas Local Collection-6 found best performer for Duration of crop (days) and

Number of branches per plant (3.80). NHRDF Red showed best result for Bulb Diameter (cm) . NHRDF Red-3 (L-652) found best for four characters such as Fresh bulb Weight (gm), Dry bulb weight (gm) ,Yield per Plot (kg) and Yield per Ha (q) in Onion and these verities may be choose for further crop improvement program in Onion crops.

References:

1. Goncalves, L. S., Rodrigues, R., Amaral, A. T. Jr., and Karasawa, M. Comparison of multivariate statistical algorithms to cluster Tomato heirloom accessions. *Genetics and Molecular Research, 2008;* **7:** 1289-1297.
2. Jakhwal R, Goswami G, Pant S.C., Kumar V, Bahuguna P and Verma S. Genetic Divergence Studies in Radish (*Raphanus Sativus* L.) Under Hilly Region of Bharsar (Uttarakhand) In India. *Annals of Horticulture, 2002;* **15 (1):** 98-101
3. Kari.Ä, L., & Golzardi, M. Genetic diversity assessment of Allium cepa L. cultivars from Bosnia and Herzegovina using SSR makers. *Genetics and Molecular Research*, 2018; **17(1):** 162-170.
4. Kumar Vipin, Taru Dumi, Arvind Kumar, Archi Gupta and Uttam Kumar.Variability, Heritability and Genetic Advance for Yield And Yield Related Traits In Tomato (*Solanum lycopersicum*). *Annals of Horticulture, 2020;* **13 (1):** 61-65.
5. Lush, J. L. Heritability of quantitative characters in farm animals. *Heretics Suppl, 1949;* 356-357.
6. Lynch, M. and Walsh, J. B. Genetics and analysis of quantitative traits. Sinaure Assocs. Inc., Sunderland, Massachusetts, USA, 1998; 980p.
7. Machado, D. L. M., de Freitas, J. A., Luz, J. M. Q., Maciel, G. M., Nogueira, A. P. O., & di Camillo, E. Phenotypic, genotypic, and environmental correlations between characters in onion segregate populations obtained under different generations. *Genetics and Molecular Research*, 2017; **16(4): 1-7.**
8. Mallor Giménez, C., Carravedo Fantova, M., Estopañán Muñoz, G., & Mallor Giménez, F. Characterization of genetic resources of onion (*Allium cepa* L.) from the Spanish secondary centre of diversity. *Spanish Journal of Agricultural Research*, 2011; **9 (1):** 144-155.
9. Mudasir, A., Nusrat, J., & Asima, A. Determination of genetic diversity in onion (*Allium cepa* L.) by multivariate analysis under long day conditions. *African Journal of Agricultural Research*, 2013; **8(45):** 5599-5606.
10. Porta, B., Rivas, M., Gutiérrez, L., & Galván, G. A.Variability, heritability, and correlations of agronomic traits in an onion landrace and derived S1 lines. *Crop Breeding and Applied Biotechnology*, 2014; **14**: 29-35.
11. Raghuwanshi, O. S., Jain, P. K., Sengupta, S. K., Dangi, A. S., Verma, N. R., & Sunil, P. Correlation and path analysis study in diverse onion (*Allium cepa* L.) genotypes. *Asian Journal of Horticulture*, 2016; **11(1):** 19-24.
12. Rivera, A., Mallor, C., Garcés-Claver, A., García-Ulloa, A., Pomar, F., & Silvar, C. Assessing the genetic diversity in onion (*Allium cepa* L.) landraces from northwest Spain and comparison with the European variability. *New Zealand Journal of Crop and Horticultural Science*, 2016; **44(2):** 103-120.
13. Segundo, V. C. V., Innecco, R., Freitas, J. A., Lima, E. N., Nogueira, A. P. O., LUZ, J., & QUEIROZ, M. Genetic Parameters and Diversity, and Correlations in Onion Strains. *Revista Caatinga*, 2022; **35:** 352-362.
14. Singh, S. R., Ahamed, N., Srivastava, K. K., Kumar, D., & Yousuf, S. Assessment of genetic divergence in long day onion (*Allium cepa* L.) through principal component and single linkage cluster analysis. *Journal of Horticultural Sciences*, 2020; **15(1):** 17-26.
15. Solanki, P., Jain, P. K., Prajapati, S., Raghuwanshi, N., Khandait, R. N., & Patel, S. Genetic analysis and character association in different genotypes of onion (*Allium cepa* L.). *International Journal of Agriculture, Environment and Biotechnology*, 2015; **8(4):** 783-789.
16. Steel, R. G. D. and Torrie, J. H. Principles and procedures of statistics. A biometrical Approach. 2nd Ed. McGraw Hill Book Co., 1980; New York.
17. Tomar H., Kumar V., Singh S., Kumar R and Kumar A. Genetic Variability, Heritability, Correlation and Path Coefficient Analysis in Amaranth (*Amaranthus spp*.) in Western Uttar Pradesh (India) *International Journal of Environment and Climate Change, 2022;* **12(11):** 1780-1791.