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Studies on correlation and path analysis in potato (*Solanum tuberosum* L.) Genotypes

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Abstract
The present investigation was conducted to study the correlation and path analysis in thirty potato (*Solanum tuberosum* L.) in a randomized block design with four replications during *kharif* 2018 under AICRP (Potato), Department of Horticulture, MARS, UAS, Dharwad, Karnataka. Correlation coefficient analysis revealed that total tuber yield had significant and positive correlation for number of tubers per plant, harvest index, number of leaves per plant, per cent plant emergence, plant height and number of shoots per plant. The path coefficient analysis revealed that harvest index and shoot fresh weight exerted higher positive direct effect on tuber yield per plant. The traits which are showing higher positive effect could be adopted in genotype selection for enhancement of tuber yield in potato.

Keywords: Correlation, path analysis, potato, genotype

Introduction
Potato is one of the most consumed staple foods and considered as fourth important food crop after rice, wheat and maize. It is nutritious, readily digestible and wholesome food with a good source of carbohydrates, vitamins, proteins, minerals and dietary fiber. The 100 gram of fresh tuber comprises 70 to 80 per cent water and 20-25 per cent tuber dry matter content with edible protein (2.8 g), total sugar (0.6 g), starch (16.3 g), crude fiber (0.5 g), fat (0.14 g), carbohydrates (22.6 g) and vitamin C (25 mg). Further potatoes are stuffed with phytonutrients like, carotenoids, flavonoids and caffeic acid which promote the health. The vitamin C in potato acts as an antioxidant. High potassium content helps to lower blood pressure and fiber content reduces the cholesterol. By considering these qualities potato is known as “Poor man’s friend” or “Poor man’s strength” or “King of vegetables”.
Though potato is temperate crop, it is well adopted to a wide range of climatic conditions. Most of the varieties perform well when days are sunny and nights are cool. The temperature around 22-24 ^{0}C is optimal for tuber production. As it is being a long day plant, it is necessary to develop varieties, which are also suitable for short day conditions.
In recent years, the per capita consumption of potato is rising day by day, hence there is need to evolve high yielding cultivars with better storage and processing qualities. This could be achieved by modern crop improvement methods. The use of genetically divergent parents in crop improvement is expected to give desirable and superior segregates (Bhatt, 1973) [5].
There is need to develop high yield yielding and promising varieties and hybrids in potato. Understanding the association of plant characteristics with yield is very much crucial for successful breeding. Correlation coefficient reveals measure and direction of association of yield components while, path analysis identifies components that effects yield directly or indirectly. Both character association and path analysis aids in formulating effective breeding strategies to evolve productive and superior cultivars. Therefore, this study was conducted with the objective to study the correlation and path analysis in potato genotypes.

Materials and Methods
The investigation was conducted under AICRP (Potato), Department of Horticulture, MARS, UAS, Dharwad during *kharif* 2018-19. Thirty genotypes were obtained from AICRP (Potato) and were evaluated using randomized block design (RBD). Each genotype was accommodated in five rows of 3 m length. The row to row spacing of 60 cm and plant to plant spacing of 20 cm was adopted. The recommended package of practices was followed.

Five plants were selected randomly from each replication and data were recorded for the characters *viz.*, days to fifty per cent plant emergence, plant emergence percentage (%), plant height (cm), number of primary shoots per plant, diameter of main stem (cm), number of compound leaves per plant, leaf area, fresh weight of shoots per plant (g plant^{-1}), dry weight of shoots per plant (g plant^{-1}), weight of` tubers per plant (g plant^{-1}), number of tubers per plant, total tuber yield per plot (kg plot^{-1}), marketable tuber yield per plot (kg plot^{-1}), unmarketable tuber yield per plot (kg plot^{-1}), total tuber yield per hectare (t ha^{-1}), marketable tuber yield per hectare (t ha^{-1}), unmarketable yield per hectare (t ha^{-1}) and harvest index (%).

Statistical Analysis

Genotypic and phenotypic correlations were calculated as per Al-Jibouri *et al.* (1958) [1] using an ANOVA and covariance matrix in which total variability was split into replications, genotypes and errors. Direct and indirect contributions of various characters to fruit yield per plant were calculated through path coefficient analysis according to Wright (1921) as elaborated by Dewey and Lu (1959) [8]. Residual effect measures the role of other possible independent variables that were not included in the study on the dependent variable. The residual effect was estimated using direct effects and simple correlation coefficients.

Results and Discussion

The current study phenotypic and genotypic correlation coefficients of were estimated in order to assess the direction and measure the association, present between tuber yield and other constituent parameters and also among themselves. These associates are presented in Table 1. It is observed that the genotypic correlations were found higher than the respective phenotypic correlations.

Correlation between tuber yield per plant and its components

The phenotypic and genotypic association of number of tubers per plant
(rp= 0.8983**, rg= 1.0022), harvest index (rp= 0.7981**, rg= 0.7758), number of compound leaves per plant (rp= 0.3006**, rg= 0.3821), per cent plant emergence (rp= 0.3044**, rg= 0.4247), plant height (rp= 0.2315*, rg= 0.2797) and number of primary shoots per plant (rp= 0.1818*, rg= 0.2662) with tuber yield per plant was found positive and significant. The phenotypic and genotypic association of leaf area (rp= 0.1756, rg= 0.2868), fresh weight of shoots (rp= 0.1744, rg= 0.2147), diameter of main stem (rp= 0.0388, rg= 0.1264) and dry weight of shoots (rp= 0.0321, rg= 0.0063) with tuber yield per plant was observed positive but non-significant. Negative and significant correlation was observed for days to fifty per cent emergence (rp= (-) 0.3225**, rg= (-) 0.3641).

Inter correlation among yield components

Harvest index registered the significant positive phenotypic and genotypic association number of tubers per plant (rp= 0.6726 **, rg= 0.7556), plant height
(rp= 0.3032 **, rg= 0.3591), leaf area (rp= 0.2506**, rg= 0.3875), number of primary shoots per plant (rp= 0.2432 *, rg= 0.314) and days to fifty per cent field emergence (rp= 0.2013*, rg= (-) 0.2361). While, harvest index had significant negative alliance with fresh weight of shoots per plant (rp= (-) 0.4138 ** rg= (-) 0.427) and dry weight of shoots per plant (rp= (-) 0.4086 ** rg= (-) 0.5046).

Number of tubers per plant exerted significant and positive phenotypic and genotypic association with per cent plant emergence (rp= 0.2889**, rg= 0.3793), number of primary shoots per plant (rp= 0.2529**, rg= 0.2979), plant height (rp= 0.2513**, rg= 0.2803) and fresh weight of shoots (rp= 0.24398*, rg=0.2612). Whereas, which had significant and negative association with days to fifty per cent field emergence (rp= (-) 0.3299** rg= (-) 0.3417).

Dry weight of shoots per plant lead to significant and positive phenotypic and genotypic association with fresh weight of shoots per plant (rp= 0.7363 **, rg= 0.7855). While, characters like days to fifty per cent field emergence (rp= (-) 0.2154* rg= (-) 0.2314) and plant height (rp= (-) 0.1945* rg= (-) 0.1967) had the significant and negative correlation. Further characters like, per cent plant emergence (rp= 0.1349, rg= 0.2027), diameter of main stem (rp= 0.0297, rg= (-) 0.0177) and number of compound leaves per plant (rp= 0.2131, rg= 0.2781) showed positive and non-significant correlation with dry weight of shoots per plant.

Fresh weight of shoots per plant exhibited that significant and positive phenotypic and genotypic association with number of compound leaves per plant
(rp= 0.2709**, rg= 0.3328), Positive and non-significant correlation with per cent plant emergence (rp= 0,0623, rg= 0.0811), whereas characters like, correlation with days to fifty per cent field emergence (rp= (-) 0.1427, rg= (-) 0.1555), plant height (rp= (-) 0.1639, rg= (-) 0.1713), number of primary shoots per plant (rp= 0.0768, rg= -0.0746), diameter of main stem (rp= (-) 0.0954, rg= (-) 0.2958) and leaf area (rp= (-) 0.1646,
rg= (-) 0.1668) with fresh weight of shoots per plant.

Leaf area reported significant and positive phenotypic and genotypic association with plant height (rp= 0.3326**, rg= 0.6604), number of primary shoots per plant (rp= 0.2603**, rg= 0.3815) and number of compound leaves per plant (rp= 0.1807*, rg= 0.3121). While, leaf area had non-significant and positive association with days to fifty per cent field emergence (rp= 0.0437 rg= 0.083) and per cent plant emergence (rp= 0.085 rg= 0.1642).

Number of compound leaves per plant registered significant and positive phenotypic and genotypic association with number of primary shoots per plant (rp= 0.4213**, rg= 0.6047) and plant height (rp= 0.2520**, rg= 0.3549). While, number of compound leaves per plant had non-significant and positive association with per cent plant emergence (rp= 0.0115, rg= 0.121) and diameter of main stem (rp= 0.075 rg= (-) 0.0269). Similar results are recorded by Darabad (2014).

The diameter of main stem had positive and non-significant phenotypic and genotypic association with plant height (rp= 0.0432, rg= 0.2181). Whereas, it had
negative and non-significant association with days to fifty per cent field emergence
(rp= (-) 0.0398, rg= (-) 0.0872), plant emergence (rp= (-) 0.0435, rg= 0.1181) and number of shoots per plant (rp= (-) 0.1521, rg= (-) 0.3163).

Number of primary shoots per plant was shown the positive and significant phenotypic and genotypic association with plant height (rp= 0.4099**, rg= 0.5052). Plant height had positive and non-significant correlation with per cent plant emergence (rp= 0.0382, rg= 0.0953) and it had negative and non-significant correlation with days to fifty per cent field emergence (rp= (-) 0.0071, rg= (-) 0.0196). Per cent plant

emergence had negative and significant correlation with days to fifty per cent field emergence (rp= (-) 0.6596**, rg= (-) 0.8312). The similar outcomes were recorded by Sattar *et al.* (2007) and Smita (2007) [15].

The outcomes of the present study shown significant and positive correlation for number of tubers per plant (rp= 0.8983**, rg= 1.0022), harvest index (rp= 0.7981**, rg= 0.7758), number of leaves per plant, per cent plant emergence (rp= 0.3044**, rg= 0.4247), plant height (rp= 0.2315*, rg= 0.2797) and number of shoots per plant (rp= 0.1818*, rg= 0.2662) with tuber yield per plant. These results reflect the findings of previous researchers Bhagowati and Saikia (2003) [3] and Smita (2007) [15].

The characters with positive and significant correlation, indicates the possibility in increasing the yield by increasing these characters in positive direction. Thus, direct selection for above parameters will be useful in enhancing tuber yield of potato (Table 1). While, the phenotypic and genotypic association of leaf area, fresh weight of shoots, diameter of main stem and dry weight of shoots had positive but non-significant correlation with tuber yield per plant. Negative and non-significant correlation for days to fifty per cent field emergence with tuber yield per plant.

These correlation outcomes are in line with works of Bhagowati *et al*. (2002) for number of tubers per plant; Majid *et al.* (2011) for plant height; Darabad *et al.* (2014) for number of shoots per plant; Sunidhi (2016) for harvest index and number of leaves per plant.

Path coefficient analysis

Path coefficient analysis of various characters on potato tuber yield based on phenotypic and genotypic correlations is depicted in Table 2, Fig 1 and 2.

Direct effects on tuber yield

Path coefficient analysis showed that harvest index (P= 0.8645; G= 1.1716) and fresh weight of shoots (P= 0.4525; G= 0.7479) highest positive direct effect.

Moderate positive direct effect was observed for number of tubers per plant (P= 0.1971; G= (-) 0.0847) on tuber yield. While, negligible positive direct effects was noticed for per cent plant emergence (P= 0.0177; G= 0.2662), plant height (P= 0.011; G= 0.0719), diameter of main stem (P= 0.0093; G= 0.1449), number of compound leaves per plant (P= 0.0364; G= (-) 0.0786), leaf area (P= 0.0098; G= (-) 0.2047) and dry weight of shoot (P= 0.0264; G= 0.0851).

Whereas days to fifty per cent field emergence (P= (-) 0.002; G= 0.2711) and number of primary shoots per plant (P= (-) 0.0615; G= 0.1329) had negligible negative effect on tuber yield per plant. These results reflect the findings of previous researchers Bhagowati and Saikia (2003) and Smita (2007) [15].

Indirect effects of yield constituents on tuber yield

Path coefficient analysis of days to fifty per cent field emergence had higher negative effect on tuber yield per plant (P= (-) 0.3225; G= (-) 0.3641). Path coefficient analysis of per cent plant emergence had higher positive effect with tuber yield per plant (P= 0.3044; G= 0.4247). Moderate positive effect of this parameter exhibited via tuber yield per plant (P= 0.2315; G= 0.2797). These results are in line with the previous reports of Patram (2014) and Patel *et al*. (2018).

Low positive effect of this character was exhibited by tuber yield per plant

(P= 0.1818; G= 0.2662). Path coefficient analysis of diameter of main stem had negligible positive effect on tuber yield per plant (P= 0.0388; G= 0.1264). Path coefficient analysis of number of compound leaves per plant exhibited higher positive effect on tuber yield per plant (P= 0.3006; G= 0.3821). Leaf area exhibited lower positive effect on tuber yield per plant (P= 0.1756; G= 0.2868). These results are in line with the previous reports of Chaudhary and Sharma (1984) [6] and Smita (2007) [15].

Path coefficient analysis of fresh weight of shoots had higher positive effect dry weight of shoots plant (P= 0.3332; G= 0.5875). Lower positive effect on total yield per plant (P= 0.1744; G= 0.2147), number of compound leaves per plant (P= 0.1226;

G= 0.2489) and number of tubers per plant (P= 0.1104; G= 0.1954). While, fresh weight of shoots had lower negative effect on harvest index (P= (-) 0.1872; G= (-) 0.3194).

Path coefficient analysis of dry weight of shoots registered the positive and indirect effect on tuber yield per plant (P= 0.0321; G= 0.0063) but it was negligible. Number of tubers per plant had higher positive effect on tuber yield per plant (P= 0.8983; G= 1.0022).

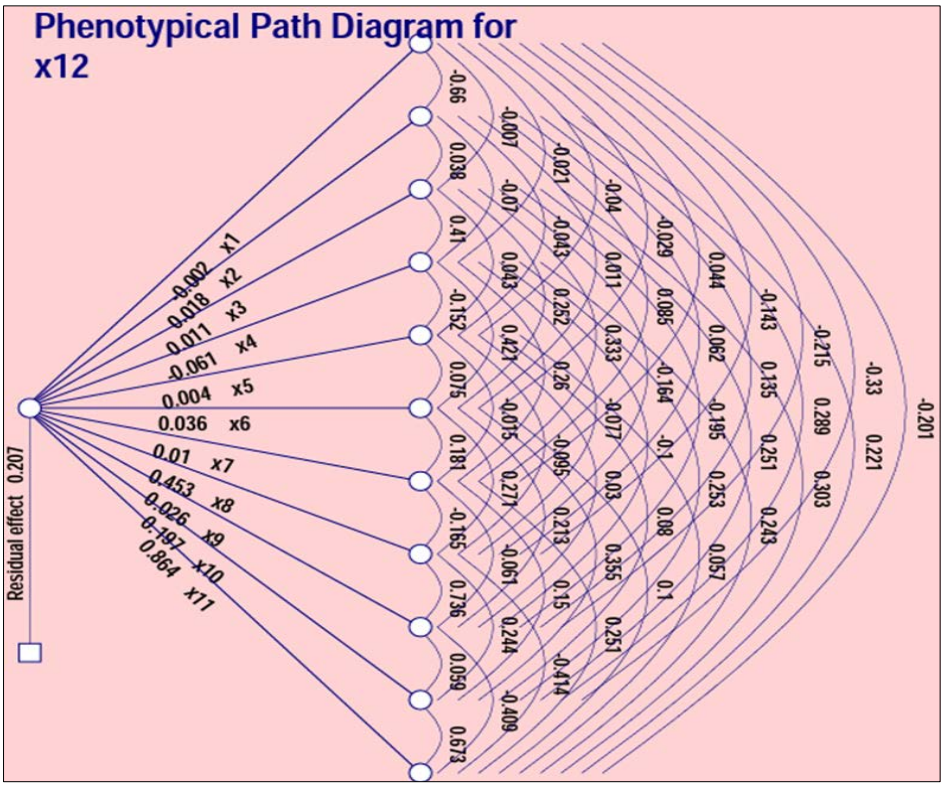
Path coefficient analysis of harvest index had high positive effect on tuber yield per plant (P= 0.7981; G= 0.7758) and number of tubers per plant (P= 0.5815;

G= 0.8852). While, higher negative effect was exhibited by fresh weight of shoots

(P= (-) 0.3577; G= (-) 0.5003) and dry weight of shoots (P= (-) 0.3532; G= (-) 0.5910). Moderate positive effect by plant height (P= 0.2621; G= 0.4207), leaf area (P= 0.2166; G= 0.4540) and number of primary shoots (P= 0.2103; G= 0.3679) and low positive effect by per cent plant emergence (P= 0.1909; G= 0.3598). These outcomes are in line with the reports Gunjan (2008), Patram (2014) and Patel *et al*. (2018).

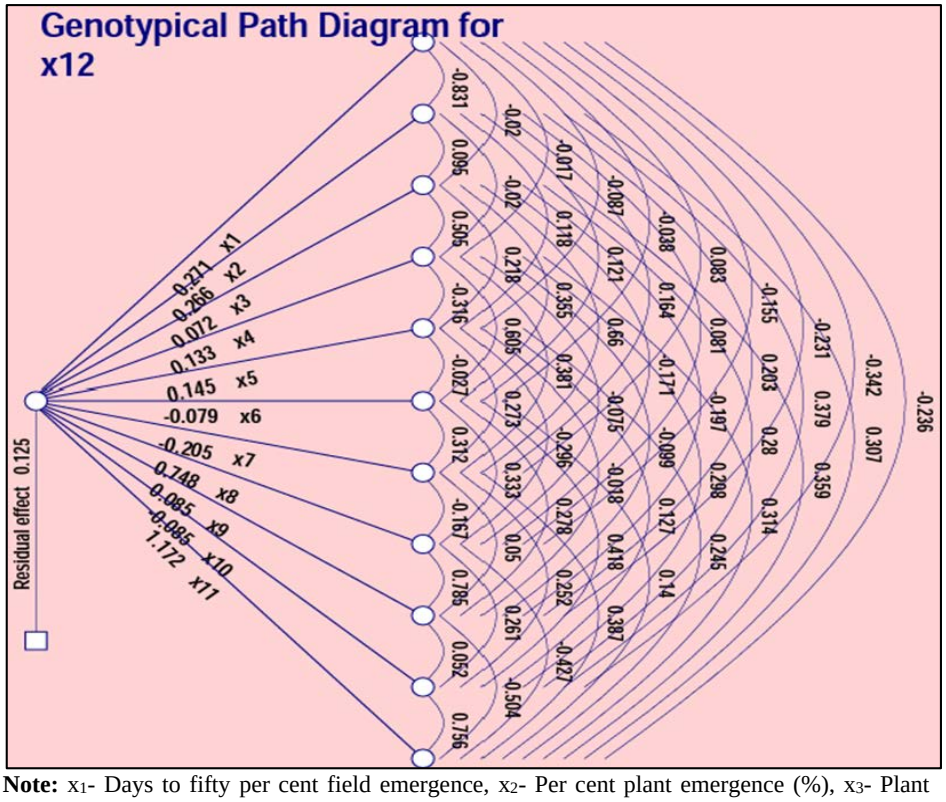
Path coefficient analysis of the study exhibited that, the harvest index (P= 0.8645; G= 1.1716) and fresh weight of shoots (P= 0.4525; G= 0.7479) had higher positive direct on tuber yield per plant, which indicates the positive correlation between these characters. The characters which are showing higher positive effect could be used to select genotypes for enhancement of tuber yield in potato (Table 2, Fig. 1 and 2). These results are in line with the previous reports for fresh weight of shoots (Chaudhary and Sharma, 1984; Smita, 2007) [15] and harvest index (Ambrish, 2007) [2].

Number of tubers per plant showed moderate positive direct effects on tuber yield per plant. While, plant emergence, plant height, diameter of main stem, number of leaves per plant, leaf area and dry weight of shoot exhibited negligible positive direct effects on tuber yield per plant. These outcomes are in line with the reports of Ozkaynak *et al*. (2003) for tuber number and Patel *et al*. (2018) for number of tubers.



Note: x_1- Days to fifty per cent field emergence, x_2- Per cent plant emergence (%), x_3- Plant height (cm), x_4- No. of primary shoots per plant, x_5- Diameter of main stem (cm), x_6- No. of compound leaves per plant, x_7- Leaf area (cm^2), x_8- Fresh weight of shoots (g $plant^{-1}$), x_9- Dry weight of shoots (g $plant^{-1}$), x_{10}- No. of tubers per plant, x_{11}- Harvest index (%) and x_{12}- Tuber yield per plant (g $plant^{-1}$).

Fig 1: Path diagram showing the influence of twelve characters on tuber yield per plant at phenotypic level



Note: x_1- Days to fifty per cent field emergence, x_2- Per cent plant emergence (%), x_3- Plant height (cm), x_4- No. of primary shoots per plant, x_5- Diameter of main stem (cm), x_6- No. of compound leaves per plant, x_7- Leaf area (cm^2), x_8- Fresh weight of shoots (g $plant^{-1}$), x_9- Dry weight of shoots (g $plant^{-1}$), x_{10}- No. of tubers per plant, x_{11}- Harvest index (%) and x_{12}- Tuber yield per plant (g $plant^{-1}$).

Fig 2: Path diagram showing the influence of twelve characters on tuber yield per plant at genotypic level

Table 1: Phenotypic (rp) and genotypic (rg) correlation coefficients among various characters in potato genotypes

Sl. No.	Characters		x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{10}	x_{12}
1	x_1	rp	1	-0.6596 **	-0.0071	-0.0214	-0.0398	-0.0291	0.0437	-0.1427	-0.2154*	-0.3299**	0.2013*	--0.3225**
		rg	1	-0.8312	-0.0196	-0.0173	-0.0872	-0.0383	0.083	-0.1555	-0.2314	-0.3417	-0.2361	-0.3641
2	x_2	rp		1	0.0382	-0.0695	-0.0435	0.0115	0.085	0.0623	0.1349	0.2889**	0.2209	0.3044**
		rg		1	0.0953	-0.0197	0.1181	0.121	0.1642	0.0811	0.2027	0.3793	0.3071	0.4247
3	x_3	rp			1	0.4099 **	0.0432	0.2520 **	0.3326 **	-0.1639	-0.1945 *	0.2513 **	0.3032**	0.2315*
		rg			1	0.5052	0.2181	0.3549	0.6604	-0.1713	-0.1967	0.2803	0.3591	0.2797
4	x_4	rp				1	-0.1521	0.4213 **	0.2603 **	-0.0768	-0.1005	0.2529**	0.2432**	0.1818*
		rg				1	-0.3163	0.6047	0.3815	-0.0746	-0.0993	0.2979	0.314	0.2662
5	x_5	rp					1	0.075	-0.0147	-0.0954	0.0297	0.08	0.0573	0.0388
		rg					1	-0.0269	0.2729	-0.2958	-0.0177	0.1269	0.2453	0.1264
6	x_6	rp						1	0.1807 *	0.2709 **	0.21318	0.3553**	0.1002	0.3006**
		rg						1	0.3121	0.3328	0.2781	0.4179	0.1397	0.3821
7	x_7	rp							1	-0.1646	-0.0611	0.1503	0.2506**	0.1756
		rg							1	-0.1668	0.0504	0.2522	0.3875	0.2868
8	x_8	rp								1	0.7363**	0.2439**	-0.4138**	0.1744
		rg								1	0.7855	0.2612	-0.427	0.2147
9	x_9	rp									1	0.0589	-0.4086**	0.0321
		rg									1	0.0523	-0.5046	0.0063
10	x_{10}	rp										1	0.6726**	0.8983**
		rg										1	0.7556	1.0022
11	x_{11}	rp											1	0.7981**
		rg											1	0.7758

* Significant at 0.05% level ** Significant at 0.01% level r_g =Genotypic correlation coefficient r_p =Phenotypic correlation coefficient

Note: x_1- Days to fifty per cent field emergence, x_2- Per cent plant emergence (%), x_3- Plant height (cm), x_4- No. of primary shoots per plant, x_5- Diameter of main stem (cm), x_6- No. of compound leaves per plant, x_7- Leaf area (cm^2), x_8- Fresh weight of shoots (g $plant^{-1}$), x_9- Dry weight of shoots (g $plant^{-1}$), x_{10}- No. of tubers per plant, x_{11}- Harvest index (%) and x_{12}- Tuber yield per plant (g $plant^{-1}$).

Table 2: Phenotypic (P) and genotypic (G) path coefficients of yield components on tuber yield per plant in potato

Sl. No.	Characters		x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{10}	x_{12}
1	x_1	P	-0.002	0.0013	0	0	0.0001	0.0001	-0.0001	0.0003	0.0004	0.0007	0.0004	-0.3225
		G	0.2711	-0.2253	-0.0053	-0.0047	-0.0236	-0.0104	0.0225	-0.0421	-0.0627	-0.0926	-0.064	-0.3641
2	x_2	P	-0.0117	0.0177	0.0007	-0.0012	-0.0008	0.0002	0.0015	0.0011	0.0024	0.0051	0.0039	0.3044
		G	-0.2212	0.2662	0.0254	-0.0052	0.0314	0.0322	0.0437	0.0216	0.054	0.101	0.0818	0.4247
3	x_3	P	-0.0001	0.0004	0.011	0.0045	0.0005	0.0028	0.0037	-0.0018	-0.0021	0.0028	0.0033	0.2315
		G	-0.0014	0.0069	0.0719	0.0363	0.0157	0.0255	0.0475	-0.0123	-0.0141	0.0201	0.0258	0.2797
4	x_4	P	0.0013	0.0043	-0.0252	-0.0615	0.0093	-0.0259	-0.016	0.0047	0.0062	-0.0155	-0.015	0.1818
		G	-0.0023	-0.0026	0.0671	0.1329	-0.042	0.0804	0.0507	-0.0099	-0.0132	0.0396	0.0417	0.2662
5	x_5	P	-0.0002	-0.0002	0.0002	-0.0615	0.0093	-0.0259	-0.016	0.0047	0.0062	-0.0155	-0.015	0.0388
		G	-0.0126	0.0171	0.0316	-0.0458	0.1449	-0.0039	0.0395	-0.0429	-0.0026	0.0184	0.0355	0.1264
6	x_6	P	-0.0011	0.0004	0.0092	0.0153	0.0027	0.0364	0.0066	0.0099	0.0078	0.0129	0.0037	0.3006
		G	0.003	-0.0095	-0.0279	-0.0475	0.0021	-0.0786	-0.0245	-0.0262	-0.0219	-0.0329	-0.011	0.3821
7	x_7	P	0.0004	0.0008	0.0033	0.0026	-0.0001	0.0018	0.0098	-0.0016	-0.0006	0.0015	0.0025	0.1756
		G	-0.017	-0.0336	-0.1352	-0.0781	-0.0559	-0.0639	-0.2047	0.0341	-0.0103	-0.0516	-0.0793	0.2868
8	x_8	P	-0.0646	0.0282	-0.0742	-0.0348	-0.0432	0.1226	-0.0745	0.4525	0.3332	0.1104	-0.1872	0.1744
		G	-0.1163	0.0607	-0.1281	-0.0558	-0.2213	0.2489	-0.1248	0.7479	0.5875	0.1954	-0.3194	0.2147
9	x_9	P	-0.0057	0.0036	-0.0051	-0.0026	0.0008	0.0056	-0.0016	0.0194	0.0264	0.0016	-0.0108	0.0321
		G	-0.0197	0.0173	-0.0167	-0.0085	-0.0015	0.0237	0.0043	0.0668	0.0851	0.0044	-0.0429	0.0063
10	x_{10}	P	-0.065	0.057	0.0495	0.0499	0.0158	0.07	0.0296	0.0481	0.0116	0.1971	0.1326	0.8983
		G	0.029	-0.0321	-0.0237	-0.0252	-0.0108	-0.0354	-0.0214	-0.0221	-0.0044	-0.0847	-0.064	1.0022
11	x_{11}	P	-0.174	0.1909	0.2621	0.2103	0.0496	0.0866	0.2166	-0.3577	-0.3532	0.5815	0.8645	0.7981
		G	-0.2766	0.3598	0.4207	0.3679	0.2873	0.1637	0.454	-0.5003	-0.591	0.8852	1.1716	0.7758

Residual effect (Phenotypic): 0.2073 Residual effect (Genotypic): 0.1246 P= Phenotypic G= Genotypic

Note: x_1- Days to fifty per cent field emergence, x_2- Per cent plant emergence (%), x_3- Plant height (cm), x_4- No. of primary shoots per plant, x_5- Diameter of main stem (cm), x_6- No. of compound leaves per plant, x_7- Leaf area (cm^2), x_8- Fresh weight of shoots (g $plant^{-1}$), x_9- Dry weight of shoots (g $plant^{-1}$), x_{10}- No. of tubers per plant, x_{11}- Harvest index (%) and x_{12}- Tuber yield per plant (g $plant^{-1}$).

Conclusion

Character association analysis showed the significant and positive association of tubers per plant and harvest index with tuber yield denoting that increase in these characteristics would lead to an increase in the yield of tuber. Whereas, days to fifty per cent field emergence had negative and non-significant correlation with tuber yield.

The path coefficient analysis revealed that harvest index and shoot fresh weight exerted higher positive direct effect on tuber yield per plant. The traits which are showing higher positive effect could be adopted in genotype selection for enhancement of tuber yield in potato.

Based on character association and path analysis, it is concluded that simultaneous selection for harvest index, fresh weight of shoots and number of tubers per plant will be more rewarding in while selecting desirable genotypes as these

characters observed highly significant and positive correlation, besides high positive direct effect on tuber yield per plant among themselves.

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