Original Research Article

Understanding the Degree of Association Among Different Horticultural Traits in Banana (*Musa paradisiaca*L.)

Abstract

The Banana is a member of the Musaceae family and is one of India's most significant fruit crops. Micronutrients are vital for any crop, and inadequate use of micronutrients in maintaining the health and production of the soil has now reached a threatening level. Therefore, the present study, "Understanding the Degree of Association Among Different Horticultural Traits in Banana (*Musa paradisiaca* L.)," was carried out. The whole study was conducted at the Experimental Farm, Department of Plant Physiology, Agricultural Biochemistry, and Medicinal and Aromatic Plants, College of Agriculture, Raipur, Chhattisgarh, during the years 2020–21 and 2021–22. The experiment was carried out with the Grand Naine cultivar of banana and laid out following a complete randomized block design in three replications. The treatment comprised different concentrations of micronutrients, *viz*., zinc (1.5 and 2.0 ppm), iron (1.5 and 2.0 ppm), and boron (0.3 and 0.6 ppm). The micronutrients were given as foliar spray at the 3rd and 5th months after planting.To find out the association between the different traits and fruit yield plant^{-1}, correlation analysis was carried out. The results showed that various traits such as plant height, number of leaves, pseudo stem girth, leaf area (morpho-physiological traits), total acidity, zinc content (biochemical traits), bunch length, number of hands bunch^{-1}, bunch weight, number of fruits hand^{-1}, average length of finger and average circumference of finger were highly ($p > 0.01$ or $p < 0.05$) and positively associated with the fruit yield plant^{-1}.

Keywords: Banana, correlation analysis, micronutrients, yield, quality traits

Introduction

The banana (*Musa paradisiaca* L.), is a member of the Musaceae family and is one of India's most significant fruit crops. Banana is referred to as "Kadali" in Sanskrit, and due to its greater socio-economic importance and variety of uses, it is also known as "Kalpataru" (a plant with virtues) in popular culture. It is frequently grown in India and is also known as the "Apple of Paradise." Tropical South and Southeast Asia are considered the origins of bananas.

Bananas are a highly popular fruit around the world due to their low cost and high nutritional content. It provides medicinal, industrial, and aesthetic benefits in addition to its nutritional benefits. Around 400 million people worldwide depend on fruit for their diet (Perea, 2003). All plant parts, including the pseudostem, flower bud, corm, and leaves, can be utilised in one way or another (Chaddha, 1974). The fruit is one of the richest sources of potassium (358 mg/100 g), which meets 8% of the daily necessary value, and is high in carbohydrates (22.84 g/100 g), energy (370 kJ/100 g), and other nutrients.

The banana crop requires an extensive amount of nutrients, and it uses both major and micronutrients in huge amounts for its growth and development (Thangaselvabai and Suresh, 2009; Hazarika & Ansari, 2010). With the advent of commercial farming, more emphasis was given to yield without taking care of soil health, and eventually, soil health deteriorated and productivity decreased. Soil is the reservoir of macro- and micronutrients (Waqeel and Khan, 2022). The production of high yields of fruit with superior quality highly depends on nutrients. As a banana crop is a nutrient-loving crop, any limitation in the supply of nutrients during the growth phases, especially during the fruit development stage, alters banana bunch size and quality (Taru et al. 2015; Mahendran et al. 2021).

For many physiological processes in plants, the application of essential nutrients in the right proportion is necessary. Micronutrients play specific roles in the growth, development, flowering, fruiting, and quality traits of fruit crops, in addition to macronutrients like nitrogen, phosphorus, and potash, which are essential for enhancing plant vigor and productivity. Zinc deficiency is the primary cause of crop failure in horticultural crops, followed by deficiencies in boron, manganese, copper, and iron (mainly induced). The micronutrients Zn and Fe are linked to different enzyme systems, whereas boron is linked to the plant's reproductive system and carbohydrate chemistry (Suman et al., 2017). These micronutrients are essential for several enzymatic processes and the synthesis of chemicals, and severe micronutrient deficiency results in impaired growth and development.

Understanding the type of association between yield and its components is critical. Correlation coefficients are used to determine the extent and direction of the relationship. Correlation studies provide information that selecting one character will result in progress for all positively correlated characters. On the other hand, yield is a complex trait that is regulated by polygenes, and its expression is highly influenced by the performance of several components (traits). Hence, knowledge of the correlation between the traits is important. Therefore, the selection of highly associated traits is important, and the generation of such data might be helpful for crop improvement programmes. Keeping in view all the above-mentioned facts, the present study, "Understanding the Degree of Association Among Different Horticultural Traits in Banana (*Musa paradisiaca* L.)," was carried out to estimate the correlation coefficients among the different traits of banana.

Material and Methods:

The whole study was conducted at a commercial tissue culture lab and the laboratory analysis was done in the Department of Plant Physiology, Agricultural Biochemistry, and Medicinal and Aromatic Plants, College of Agriculture, Raipur, Chhattisgarh, during the years 2020–21 and 2021–22. The experiment was laid down following the complete randomized block design with three replications. The Grand Naine cultivar of banana was used for the investigation, and the planting materials were procured from the tissue culture laboratory at Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The seedlings were irrigated at regular intervals, and need-based plant protection measures were taken as and when necessary. The treatment comprised different concentrations of micronutrients, *viz*., zinc (1.5 and 2.0 ppm), iron (1.5 and 2.0 ppm), and boron (0.3 and 0.6 ppm), with a basal dose of N: 160g, P: 300g and K: 160g plant^{-1} (100%). The micronutrients were given as foliar spray at the 3rd and 5th months after planting, while boron was applied at the flowering and fruiting stages in two equal splits during both the years.

The data on various morphological traits, *viz*., plant height, number of leaves per plant, pseudo stem girth, number of emerged suckers plant-1, and physiological traits like total leaf area, chlorophyll a, b, and total chlorophyll in leaves were recorded during the crop growth stages after the foliar application of micronutrients. The phenological traits viz., number of days planting to inflorescence emergence, number of days inflorescence emergence to harvesting, and total crop duration were recorded when crop appears to the respective stage after foliar treatment of micronutrients. The biochemical traits such as reducing and non-reducing sugar, total sugar, acidity, total soluble solids, total carbohydrate, ascorbic acid, potassium, zinc, and iron content in leaves were recorded after harvest from fruit and dried leaves. The yield contributing traits like bunch length, bunch weight, number of hands per bunch, number of fruits per hand, average length of finger, average circumference of finger, and yield of banana plant^{-1} during physiological maturity and at the harvesting stage.

3. Results and Discussion

3.1.Association of morpho-physiologicaltraits with fruit yield plant^{-1}

The correlation analysis estimates the joint relationship between various plant traits and determines the traits on which the selection can be made for improvement in yield. In the present study the correlation analysis was carried out and results are presented in tables01 to 09.

The phenotypic correlations between seed yield and various morpho-physiological traits (plant height, number of leaves per plant, pseudostem girth, number of emerged suckers plant^{-1}, and physiological traits like total leaf area, chlorophyll a, b, and total chlorophyll in leaves) suggested that there were significant association was noticed at $p<0.01$ or $p<0.05$significance levels.

During the first year the correlation analysis indicated that fruit yield plant^{-1} was highly significant and positively correlated with traits *viz*., plant height (0.966), pseudo stem girth (0.975) and leaf area (0.968) at $p<0.01$and $p<0.05$ significance level. In addition, fruit yield was also found to associated with number of leaves (0.857)at $p<0.05$ significance level. Similarly, during the second year, traits such asnumber of leaves (0.968), number of emerged suckers (0.973), at both 1% and 5% significance level; whereas plant height (0.847), pseudo stem girth (0.822), chlorophyll b (0.825) and leaf area (0.804) at 5% significance level were found positively correlated with fruit yield plant^{-1}.The pooled data analysis also suggested similar trend and traits *viz*., plant height (0.974), number of leaves (0.938), pseudo stem girth (0.962), number of emerged suckers (0.968) and leaf area (0.963) were showed a significantly high and positive correlation with seed yield at both $p<0.01$and $p<0.05$ significance level.

The obtained data from correlation analysis suggested that during both the years traits such as plant height, number of leaves, pseudo stem girth and leaf area were highly and positively correlated with fruit yield plant^{-1}.

3.2. Association of biochemicaltraits with fruit yield plant^{-1}

The biochemical (reducing and non-reducing sugar, total sugar, acidity, total soluble solids, total carbohydrate, ascorbic acid, boron, zinc, and iron content in leaves) traits were estimated during both the season of study and subjected to correlation analysis to explore their relationship with fruit yield plant^{-1}. During first season it was reported that the acidity (0.977) and zinc content (0.946) were showed a highly positive and significantly ($p<0.01$ and $p<0.05$) associated with fruit yield plant^{-1}. Likewise, during second season also similar traits, acidity (0.868) and zinc content (0.835) were found to be positively associated with fruit yield plant^{-1}at $p<0.01$ and $p<0.05$ significance level. The pooled data also suggested similar trend as acidity (0.967) and zinc content (0.977) were positively and significantly associated with fruit yield at both $p<0.01$ and $p<0.05$ significance level. The results from correlation analysis showed that traits *viz.*, total acidity and zinc content was found highly correlated with fruit yield plant^{-1}.

3.3 Association of phenological and yield contributingtraits with fruit yield plant^{-1}

The different phenological (number of days planting to inflorescence emergence, number of days inflorescence emergence to harvesting, and total crop duration) and yield contributing traits were (bunch length, bunch weight, number of hands per bunch, number of fruits per hand, average length of finger, average circumference of finger) were recorded and subjected to correlation analysis and during both the year of study.

The phenological traits *viz.*, number of days planting to inflorescence emergence (first year: -0.997; second year: -0.890), number of days inflorescence emergence to harvesting (first year: -0.986; second year: -0.914), and total crop duration (first year: -0.991; second year: -0.909) were showed a negativerelationship with fruit yield plant^{-1}at both $p<0.01$and $p<0.05$ significance level. Similarly, the pooled data also suggested a negative relationship between number of days planting to inflorescence emergence (-0.991), number of days inflorescence emergence to harvesting (-0.979), and total crop duration (-0.985) and fruit yield plant^{-1} at both $p<0.01$and $p<0.05$ significance level. This indicates that the early flowering and early crop maturity resulted in lower fruit yield plant^{-1} in banana.

Further, the results from correlation analysis suggested that during both the years (first and second year) yield contributing traits *viz.*, bunch length (first year: 0.899; second year: 0.815), bunch weight (first year: 0.958; second year: 0.763), number of hands per bunch (first year: 0.897; second year: 0.852), number of fruits per hand (first year: 0.957; second year: 0.908), average length of finger (first year: 0.974; second year: 0.792), average circumference of finger (first year: 0.916; second year: 0.954) were positively associated with fruit yield plant^{-1} at both $p<0.01$and $p<0.05$ significance levels. The pooled data also indicated similar results and traits like bunch length (0.928), bunch weight (0.944), number of hands per bunch (0.920), number of fruits per hand (0.994), average length of finger (0.932), average circumference of finger (0.972) was positively associated with fruit yield plant^{-1} at both $p<0.01$and $p<0.05$ significance levels.

The results from correlation analysis suggested that among the morphological traits such as plant height, number of leaves, pseudo stem girth, leaf area (morpho-physiological traits), total acidity, zinc content (biochemical traits), bunch length, number of hands bunch^{-1}, bunch weight, number of fruits hand^{-1}, average length of finger and average circumference of finger were highly ($p > 0.01$ or $p < 0.05$) and positively associated with the fruit yield plant^{-1}. These findings suggested that these traits could be exploited as selection criteria in the genetic improvement programmes in banana.

Analysis of correlations between characteristics has been widely used in plant breeding, where often a large number of characteristics must be considered simultaneously (Hashemi and Khadiv, 2020; Dias et al., 2017). This analysis is often used to assist in indirect selection for certain characteristics (Hashemi and Khadiv, 2020; Maurya et al., 2019). An analysis of the correlation between these characteristics provides information that will assist in the selection of crops. In the present study, different observed traits were associated with each other, and similar results were also reported by previous researchers such as Kumar et al. (2014), Nyine et al. (2017), Bhagat et al. (2017)Asmare et al. (2021), and Alo Sora andGuji, (2023) in banana.

Conclusion

A study to find out the association between various phenological, morphological, biochemical, yield contributing, and yield traits in banana was carried out. The correlation analysis showed that the fruit yield was positively associated with plant height, number of leaves, pseudo stem girth, leaf area (morpho-physiological traits), total acidity, zinc content (biochemical traits), bunch length, number of hands bunch^{-1}, bunch weight, number of fruits hand^{-1}, average length of finger and average circumference of finger were highly ($p > 0.01$ or $p < 0.05$) and positively associated with the fruit yield plant^{-1}. In conclusion, the identified traits can be used for the indirect selection of high-yielding banana cultivars in future breeding improvement programs.

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Table 01:Phenotypic correlation analysis among morpho-physiological characters with fruit yield plant-1 during first year

	PH	NOL	PSG	NSE	chl A	chl B	TC	LA	FYP
PH	1.000								
NOL	0.919**	1.000							
PSG	0.961**	0.91**	1.000						
NSE	0.982**	0.852*	0.92**	1.000					
chl A	0.087	0.216	0.229	0.064	1.000				
chl B	0.383	0.471	0.45	0.372	0.891**	1.000			
TC	0.125	0.283	0.245	0.093	0.987**	0.932**	1.000		
LA	0.947**	0.86*	0.921**	0.971**	0.249	0.519	0.273	1.000	
FYP	0.966**	0.857*	0.975**	0.966**	0.18	0.444	0.194	0.968**	1.000

Table 02:Phenotypic correlation analysis among morpho-physiological characters with fruit yield plant-1 during second year

	PH	NOL	PSG	NSE	chl A	chl B	TC	LA	FYP
PH	1.000								
NOL	0.904**	1.000							
PSG	0.97**	0.872*	1.000						
NSE	0.884**	0.964**	0.854*	1.000					
chl A	0.11	0.373	0.168	0.311	1.000				
chl B	0.551	0.802*	0.513	0.78*	0.723	1.000			
TC	0.133	0.404	0.18	0.353	0.997**	0.76*	1.000		
LA	0.992**	0.863*	0.971**	0.848*	0.014	0.449	0.034	1.000	
FYP	0.847*	0.968**	0.822*	0.973**	0.319	0.825*	0.358	0.804*	1.000

Significance level: ****highly significant (p< 0.01), *significant (p>0.01 or p< 0.05).** PH: plant height; NOL: number of leaves; PSG: pseudo stem girth; NSE: number of sucker emergence; Chl A: Chlorophyll A; Chl B: Chlorophyll B; TC: total chlorophyll; LA: leaf area; FYP: fruit yield plant-1

Table 03: Phenotypic correlation analysis among morpho-physiological characters with fruit yield plant^{-1} of pooled data

	PH	NOL	PSG	NSE	chl A	chl B	TC	LA	FYP
PH	1.000								
NOL	0.925**	1.000							
PSG	0.967**	0.911**	1.000						
NSE	0.989**	0.906**	0.927**	1.000					
chl A	0.094	0.31	0.196	0.112	1.000				
chl B	0.452	0.63	0.473	0.495	0.848*	1.000			
TC	0.121	0.358	0.207	0.143	0.994**	0.882**	1.000		
LA	0.979**	0.911**	0.942**	0.977**	0.162	0.5	0.184	1.000	
FYP	0.974**	0.938**	0.962**	0.968**	0.253	0.616	0.282	0.963**	1.000

Significance level: **highly significant ($P < 0.01$), *significant ($P > 0.01$ or $P < 0.05$). PH: plant height; NOL: number of leaves; PSG: pseudo stem girth; NSE: number of sucker emergence; Chl A: Chlorophyll A; Chl B: Chlorophyll B; TC: total chlorophyll; LA: leaf area; FYP: fruit yield plant-1

Table 04: Phenotypic correlation analysis among biochemical characters with fruit yield plant^{-1} during first year

	RS	nRS	TS	TA	TSS	AA	NC	PC	KC	BC	IC	ZC	TCC	FYP
RS	1.000													
nRS	0.896**	1.000												
TS	0.965**	0.981**	1.000											
TA	0.135	-0.018	0.048	1.000										
TSS	0.383	0.165	0.265	0.722	1.000									
AA	0.570	0.725	0.676	0.237	-0.110	1.000								
NC	0.685	0.477	0.580	0.702	0.892**	0.225	1.000							
PC	0.732	0.617	0.683	0.680	0.582	0.646	0.849*	1.000						
KC	0.714	0.482	0.596	0.090	0.681	-0.131	0.742	0.449	1.000					
BC	0.931**	0.947**	0.965**	0.029	0.099	0.771*	0.490	0.702	0.455	1.000				
IC	0.490	0.224	0.347	0.330	0.869*	-0.324	0.791*	0.378	0.916**	0.167	1.000			
ZC	0.384	0.259	0.321	0.919**	0.578	0.564	0.687	0.813*	0.076	0.339	0.198	1.000		
TCC	0.814*	0.841*	0.851*	0.354	0.201	0.908**	0.520	0.775*	0.220	0.881**	0.059	0.668	1.000	
FYP	0.181	0.035	0.099	0.986**	0.683	0.331	0.691	0.736	0.076	0.093	0.274	0.946**	0.419	1.000

Significance level: ****highly significant (p<0.01), *significant (p> 0.01 or p< 0.05).** RS: reducing sugars; nRS: non-reducing sugars; TS: total sugars; TA: titrable acidity; TSS: total soluble solids; AA: ascorbic acid; NC: nitrogen content; PC: phosphorus content; KC: potassium content; BC: boron content; IC: iron content; ZC: zinc content: TCC: total carbohydrate content; FYP: fruit yield plant^{-1}

Table 05:Phenotypic correlation analysis among biochemical characters with fruit yield plant^{-1} during second year

	RS	nRS	TS	TA	TSS	AA	NC	PC	KC	BC	IC	ZC	TCC	FYP
RS	1.000													
nRS	0.926**	1.000												
TS	0.981**	0.982**	1.000											
TA	-0.428	-0.106	-0.269	1.000										
TSS	0.009	0.121	0.067	0.643	1.000									
AA	0.669	0.782*	0.740	-0.093	-0.226	1.000								
NC	0.305	0.567	0.446	0.724	0.759*	0.334	1.000							
PC	0.114	0.457	0.294	0.711	0.450	0.359	0.807*	1.000						
KC	0.368	0.457	0.421	0.471	0.906**	0.146	0.832*	0.467	1.000					
BC	0.888**	0.983**	0.954**	-0.062	0.094	0.807*	0.576	0.518	0.443	1.000				
IC	0.132	0.240	0.190	0.612	0.964**	-0.161	0.813*	0.425	0.909**	0.203	1.000			
ZC	-0.440	-0.095	-0.269	0.837*	0.262	0.212	0.498	0.703	0.163	-0.034	0.172	1.000		
TCC	0.757*	0.944**	0.869*	0.149	0.168	0.761*	0.694	0.677	0.427	0.935**	0.279	0.178	1.000	
FYP	-0.067	0.291	0.117	0.889**	0.519	0.318NS	0.851*	0.912**	0.519	0.363	0.516	0.835*	0.522	1.000

Significance level: ****highly significant (p< 0.01), *significant (p> 0.01 or p< 0.05).** RS: reducing sugars; nRS: non-reducing sugars; TS: total sugars; TA: titrable acidity; TSS: total soluble solids; AA: ascorbic acid; NC: nitrogen content; PC: phosphorus content; KC: potassium content; BC: boron content; IC: iron content; ZC: zinc content: TCC: total carbohydrate content; FYP: fruit yield plant^{-1}

Table 06: **Phenotypic correlation analysis among biochemical characters with fruit yield plant^{-1} during of pooled analysis**

	RS	nRS	TS	TA	TSS	AA	NC	PC	KC	BC	IC	ZC	TCC	FYP
RS	1.000													
nRS	0.970**	1.000												
TS	0.991**	0.994**	1.000											
TA	-0.195	-0.081	-0.133	1.000										
TSS	0.159	0.127	0.143	0.681	1.000									
AA	0.617	0.775*	0.709	0.088	-0.177	1.000								
NC	0.495	0.524	0.515	0.712	0.845*	0.284	1.000							
PC	0.436	0.547	0.501	0.691	0.517	0.552	0.838*	1.000						
KC	0.588	0.567	0.582	0.510	0.807*	0.236	0.919**	0.796*	1.000					
BC	0.935**	0.981**	0.968**	-0.004	0.101	0.793*	0.553	0.640	0.574	1.000	-			
IC	0.016	-0.087	-0.041	0.282	0.845*	-0.475	0.469	0.037	0.524	-0.189	1.000			
ZC	-0.083	0.073	0.004	0.931**	0.491	0.374	0.645	0.777*	0.492	0.153	0.044	1.000		
TCC	0.857*	0.922**	0.900**	0.178	0.149	0.835*	0.620	0.727	0.614	0.956**	-0.229	0.367	1.000	
FYP	-0.046	0.101	0.036	0.968**	0.612	0.312	0.744	0.818*	0.571	0.182	0.167	0.977**	0.357	1.000

Significance level: **highly significant (P < 0.01), *significant (P > 0.01 or P < 0.05). RS: reducing sugars; nRS: non-reducing sugars; TS: total sugars; TA: titrable acidity; TSS: total soluble solids; AA: ascorbic acid; NC: nitrogen content; PC: phosphorus content; KC: potassium content; BC: boron content; IC: iron content; ZC: zinc content: TCC: total carbohydrate content; FYP: fruit yield plant^{-1}

Table 07:Phenotypic correlation analysis among phenological and yield contributing characters with fruit yield plant^{-1} during first year

	NDI	NIH	TCD	BL	BW	NHB	NFH	ALF	ACF	FYP
NDI	1.000									
NIH	0.963**	1.000								
TCD	0.989**	0.993**	1.000							
BL	-0.839*	-0.920**	-0.892**	1.000						
BW	-0.900**	-0.945**	-0.933**	0.910**	1.000					
NHB	-0.839*	-0.924**	-0.894**	0.963**	0.951**	1.000				
NFH	-0.932**	-0.941**	-0.946**	0.858*	0.973**	0.925**	1.000			
ALF	-0.915**	-0.973**	-0.956**	0.944**	0.944**	0.921**	0.922**	1.000		
ACF	-0.865*	-0.892**	-0.888**	0.891**	0.970**	0.945**	0.975**	0.909**	1.000	
FYP	-0.977**	-0.986**	-0.991**	0.899**	0.958**	0.897**	0.957**	0.974**	0.916**	1.000

Table 08:Phenotypic correlation analysis among phenological and yield contributing characters with fruit yield plant^{-1} during second year

	NDI	NIH	TCD	BL	BW	NHB	NFH	ALF	ACF	FYP
NDI	1.000									
NIH	0.974**	1.000								
TCD	0.992**	0.995**	1.000							
BL	-0.988**	-0.947**	-0.971**	1.000						
BW	-0.954**	-0.923**	-0.943**	0.973**	1.000					
NHB	-0.991**	-0.973**	-0.988**	0.992**	0.982**	1.000				
NFH	-0.977**	-0.969**	-0.979**	0.941**	0.887**	0.95**	1.000			
ALF	-0.967**	-0.906**	-0.939**	0.975**	0.976**	0.972**	0.918**	1.000		
ACF	-0.964**	-0.96**	-0.968**	0.912**	0.861*	0.93**	0.988**	0.895**	1.000	
FYP	-0.890**	-0.914**	-0.909**	0.815*	0.763*	0.852*	0.908**	0.792*	0.954**	1.000

Significance level: **highly significant ($p< 0.01$), *significant ($p> 0.01$ or $p< 0.05$). NDI: Number of days from planting to inflorescence emergence (days); NIH: Number of days inflorescence emergence to harvesting (days); TCD: total crop duration; BL: bunch length; BW: bunch weight; NHB: number of hands of bunch; NFH: number of fingers hands^{-1}, ALF: Average length of finger; ACF: Average circumference of finger; FYP: Fruit yield plant^{-1}

Table 09:Phenotypic correlation analysis among yield contributing characters with fruit yield plant^{-1} of pooled analysis

	NDI	NIH	TCD	BL	BW	NHB	NFH	ALF	ACF	FYP
NDI	1.000									
NIH	0.997**	1.000								
TCD	0.999**	0.999**	1.000							
BL	-0.961**	-0.963**	-0.963**	1.000						
BW	-0.964**	-0.96**	-0.963**	0.993**	1.000					
NHB	-0.947**	-0.95**	-0.95**	0.989**	0.994**	1.000				
NFH	-0.989**	-0.977**	-0.983**	0.947**	0.962**	0.946**	1.000			
ALF	-0.95**	-0.941**	-0.946**	0.982**	0.985**	0.964**	0.941**	1.000		
ACF	-0.956**	-0.94**	-0.948**	0.928**	0.96**	0.945**	0.985**	0.931**	1.000	
FYP	-0.991**	-0.979**	-0.985**	0.928**	0.944**	0.92**	0.994**	0.932**	0.972**	1.000

Significance level: **highly significant (p< 0.01), *significant (p> 0.01 or p< 0.05). NDI: Number of days from planting to inflorescence emergence (days); NIH: Number of days inflorescence emergence to harvesting (days); TCD: total crop duration; BL: bunch length; BW: bunch weight; NHB: number of hands of bunch; NFH: number of fingers hands^{-1}, ALF: Average length of finger; ACF: Average circumference of finger; FYP: Fruit yield plant^{-1}