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An Assessment of the Growth and Productivity of Bottle Gourd (Lagenariasiceraria) Accessions in Southeastern Nigeria

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Abstract: Assessing the agronomic performance of different bottle gourd accessions (Lagenariasiceraria) is crucial for educating farmers and the public about the agricultural practices involved in bottle gourd production, as well as for identifying the most suitable accession for the specific agro-ecological zone. **Problem:** Prior research has mostly examined the nutritional makeup of bottle gourd, but there has been a lack of investigation on its agronomic characteristics. To assess the genetic variation among different bottle gourd accessions and then develop a correlation between their agronomic characteristics. This will aid in the selection of high-yielding accessions for the improvement of bottle gourd, which is now at risk of extinction in this specific agro-climatic zone. **Approach:** The experiment was conducted using a Randomized Complete Block Design (RCBD) with 3 replications and 7 bottle gourd accessions as treatments. Random selection was employed to choose the most superior plants from each plot, which were then labeled and utilized as sample plants for data collection. Data pertaining to vegetative development, floral characteristics, and yield parameters were gathered and subjected to statistical analysis using Analysis of Variance for Randomized Complete Block Design. Thetreatment means were segregated using the least significant difference at a significance threshold of 5%. **Findings:** Onitsha (round), IfiteOgwari

(long), IfiteOgwari (prolific round) and IfiteOgwari (prolific long) accessions showed outstanding performance in terms of fruit length, weight, and yield from this Agro-ecological zone understudy. **Conclusion:** This study demonstrated a distinct variety among the 7 bottle gourd accessions and established a correlation between agronomic variables that can be utilized in breeding programs. Further research is advised to establish the genetic foundation of bottle gourd for the aim of breeding.

Keywords: Lagenariasiceraria, Crop production, Assessment, Growth, Yield, Relationship, Accessions, Agronomic, Farmers, Breeders.

Introduction

The bottle gourd, or Lagenariasiceraria (Molina) Standl. in scientific parlance, is a kind of vine grown for its fruit. It is also known as the birdhouse gourd, Tasmania bean, calabash gourd, white flowered gourd plant, and long melon. The plant belongs to the Cucurbitaceae family, specifically the Cucurbitoideae subfamily and Benincaseae tribe (Richardson, 1972).

Bottle gourd exhibits a general adaptability to various environmental circumstances, but it thrives mostlucratively in a rather arid and warm area. The crop has robust performance in both humid and aridseasons. The cultivation of this plant is particularly suitable for sandy loamy soils. The ideal conditions forcultivating bottle gourd include soil that is abundant in organic matter, has proper drainage, and fallsbetween a pH range of 6.5 to 7.5. This crop thrives in a temperate climate. An optimal temperature rangeof 18 – 22 °C during the day and -1.11 to 1.67 °C at night is ideal for promoting good growth andachieving a high fruit set. It is not resistant to frost (Mayura, et al., 2009).

Nigeria has a rich genetic variability in terms of fruit size and shape (Richardson, 1972). Farmers in Nigeria have cultivated and harvested bottle gourd because of its diverse applications in medicine, health, and as a supplementary food resource. Despite its growing significance, bottle gourd is gradually becoming extinct in Nigeria due to insufficient research on its agricultural practices. However, very little work was done to document the variability for various traits in germplasm in Nigeria. Collection of genetic resources and systematic study of the nature and magnitude of variability present in the germplasm and association among the various characters existing forms the basis for any crop improvement program. Additionally, the genetic foundation of the bottle gourd for breeding purposes has been dispersed, and the findings of studies have not consistently been published in scientific journals. The lack of accessible research findings and limited availability of this material to academics has significantly hindered the progress of further studies on bottle gourd.Hence, the present investigation was undertaken to collect and study

the variability among the bottle gourd accessions from the southeastern agroecological zone, Nigeria.

Experimental Procedures

Materials and Methods

The experiment was conducted at the Horticultural farm of the Faculty of Agriculture, Nnamdi AzikiweUniversity, IfiteOgwari Campus, Ayamelum Local Government, Anambra State, Nigeria.Seven (7) bottle gourd accessions obtained from various agroecological regions in Anambra State wereutilized. The bottle gourd accessions used in this experiment were named based on the shapes of the bottle gourd fruits collected along with the location names of collection. They are as follows: Onitsha (long), Onitsha (round), Ekwulobia(prolific long), Ekwulobia (round), IfiteOgwari (long) , IfiteOgwari(prolific round), and IfiteOgwari(prolific long). The experiment was conducted using a Randomized Complete Block Design(RCBD) with three (3) replicates. The dimensions of the experimental field, which covered an area of181.56 square meters, were determined by utilizing measuring tape, rope, and pegs. The experimentalsite was prepared by clearing it and then ploughing and harrowing it using manual tools such as a cutlassand hoe. The insect problem was effectively managed by employing the insecticide Cyperforce(Cypermethrin 10% E.C). The plot comprises of flat beds, each measuring 1.4m2, with a horizontal spacingof 2m between each bed and a vertical spacing of 1m. The application of poultry manure was performedby incorporating it into the soil of the bed one week prior to planting. The Bottle gourds were cultivated bythe process of directly planting the seeds. Three seeds of each accession were planted in each hole perbed at a depth of 2.5cm, with a spacing of 1m x 1m. We performed regular weeding at two-week intervals using manual labor and hoes.

Data collection

The mean of the two highest-performing plants from each bed were selected for data collection,specifically, Emergence parameters include the number of days it takes for a plant to emerge, the numberof days it takes for 50% of the plants to emerge, and the number of days it takes for 100% of the plants toemerge. Vegetative metrics, such as vine length, intermodal length, number of primary branches, petiolelength, and peduncle length. Floral factors include the time it takes for a plant to reach 50% flowering, thetime it takes for male flowers to initiate, and the time it takes for female flowers to initiate. The yield parameters to be measured are fruit length, fruit breadth, fruit weight, and fruit yield per plant.Quantitative analysis of data using statistical methods. An analysis of variance (ANOVA) was conducted using Genstat Release 10.3 Discovery Edition 9PC/Windows) Genstat edition 4 for the Randomized Complete Block Design (RCBD) in the field

experiment. In cases where significant differences were detected, the least significance difference (LSD)test at a 5% probability level was employed to compare the means of the treatments.

Discussion

The physical and chemical characteristics of the soil of the experimental site were taken before planting. The physico-chemical characteristics were analyzed and the result given on Table 1. The soil of the experimental site was about 78.80% sand, 8.80%silt and 12.40% clay respectively. The soil pH was slightly acidic (6.56) and was generally low for the cultivation of bottle gourd as reported by Food and Agricultural Organization (FAO, 2008). It was also low in total nitrogen (0.07%), phosphate level (3.63mg/kg) and potassium(0.18Cmol/kg). The soil sample had an organic carbon content of 0.78%, organic matter content of 1.34%, total exchangeable acidity of 1.20Cmol/kg, aluminium content of 0.70 Cmol/kg, sodium content of 0.14 Cmol/kg, calcium content of 2.40 Cmol/kg, magnesium content of 1.60 Cmol/kg, CEC of 5.52 Cmol/kg and base saturation of 78.2%. The soil textural class was sandy loam.

Table 2. Showed Emergence parameters of the bottle gourd accessions. The bottle gourd accessions displayed significant differences ($p>0.05$) for days to emergence. Greater number of days (8.00) to emergence was recorded for accession IfiteOgwari (prolific long), while the lowest number of days to emergence (5.00) was recorded for accessions Onitsha (long) and Ekwulobia (round) respectively.The result of this research indicate that thebottle gourd accessions exhibited variations in theiremergence parameters that were assessed. Onitsha (long) and Ekwulobia (round) had the quickest seedlingemergence intervals. Seeding was conducted at the onset of the wet season. Onitsha (long) and Ekwulobia (round)are likely to experience better seedling emergence due to the low humidity.

Table 3. Showed the Vegetative parameters of the bottle gourd accessions.There were significant differences at ($p>0.05$) among the accessions in their vegetative parameters. Ekwulobia (prolific long) had the highest vine length at 6 and 9 WAP with mean values of 330cm and 503.3cm respectively while IfiteOgwari (prolific long) had the lowest vines at 6 and 9 WAP with mean values of 60cm and 140cm respectively. Onitsha (long) had the highest internodal length at 6 and 9 WAP with mean values of 16.33cm and 19.00cm respectively while IfiteOgwari (prolific long) had the lowest internodes at 6 and 9 weeks after planting with mean values of 5.67cm and 7.67cm respectively.Onitsha (long) and IfiteOgwari (prolific long) both had the highest number of branches at 6 and 9 weeks after planting with mean values each of 2.00 and 4.67 respectively while IfiteOgwari (prolific long) had the lowest with mean

values of 1.00 and 1.33 at 6 and 9 weeks after planting respectively. Ekwulobia (round) had the highest petiole length at 6 and 9 WAP with mean values of 13.33cm and 15.33cm respectively while the lowest petiole length belongs to IfiteOgwari (prolific long) with mean values of 4.67cm and 6.67cm at 6 and 9 weeks after planting respectively. Ekwulobia (round) had the highest male peduncle length at 6 and 9 weeks after planting with mean values of 5.67cm and 10.33cm respectively while the lowest male peduncle length belongs to Ekwulobia (prolific long) with mean values of 4.33cm and 9.33cm at 6 and 9 WAP respectively. Onitsha (long) had the highest female peduncle length at 6 and 9 weeks after planting with mean values of 5.33cm and 10.33cm respectively while the lowest female peduncle length belongs to IfiteOgwari (prolific long) with mean values of 2.67cm and 8.00cm at 6 and 9 weeks after planting respectively.

Ogwari 3 experienced delayedseedling emergence and exhibited the shortest vine length at both 6 and 9 weeks after planting,potentially due to the planting site's influence as shown in Table 3. Similarly, Yetisir, (2008) found that the emergenceperiod, fruit weight, growth rate, average fruit weight, and number of female flowers were stronglyimpacted by the agricultural location. The vine length of the Ekwulobia (prolific long) accession exceeded that of theother accessions studied, likely due to the fact thatEkwulobia (prolific long) accession's leaves were adequately exposed tosunlight, thereby optimizing photosynthesis. The result of these findings aligns with Yetisiret al. (2008) research, whichemphasizes the significance of using appropriate supports, such as stakes, in the growth of climbingcrops. These supports play a crucial role in exposing the leaves to sunlight, hence maximizingphotosynthesis. Onitsha (long) accession exhibited the greatest internodal length. The Ekwulobia (round)accession exhibited the greatest petiole length, likely due to its early emergence. Ekwulobia (round) exhibits thegreatest peduncle length, which is observed in both male and female crops. Higher number of branchesperplant was noted in Onitsha (long) and IfiteOgwari (prolific long) accessions,perhaps this is due to the fact that thesespecific accessions have a more efficient use of sunlight, achieved by producing a greater number ofleaves and side branches. As a result, they are able to assimilate more carbohydrates, as noted byYetisiretal. (2008). There were non-significant differences at ($p>0.05$) among the accessions in their floral parameter except in days to female flower initiation Table 5. Ekwulobia (prolific long) had the highest days to 50% flower emergence with mean value of 30.33 while Ekwulobia (round) had the lowest days with mean value of 28.00. Onitsha (long) and Onitsha (round) both had the highest days to male flower initiation with mean values each of 44.33 while IfiteOgwari (long) had the lowest days to male flower initiation with mean value of 42.67. Thus, days to female flower initiation showed significant differences at ($p>0.05$) among the accessions.

IfiteOgwari (prolific round) had the highest days to female flower initiation with mean values of 53.67 while Ekwulobia (prolific long) had the lowest days to female flower initiation with mean value of 50.67

Table 5 showed the Yield parameters of the bottle gourd accessions.There were significant differences at ($p>0.05$) among the accessions in their yield parameters. IfiteOgwari (long) had the highest fruit length with mean value of 21.33cm while Onitsha (round) had the lowest fruit length with mean value of 16.67cm. Onitsha (long) had the highest fruit width with mean value of 7.33cm while Ekwulobia (prolific long) had the lowest fruit length with mean value of5.33cm. IfiteOgwari (prolific long) had the highest fruit weight with mean value of 0.67kg while Ekwulobia (prolific long) had the lowest fruit weight with mean value of 0.13kg. IfiteOgwari (prolific round) had the highest fruit yield with mean value of 3.67kg while Ekwulobia(round) had the lowest fruit yield with mean value of 1.33kg.

However, Ogwari 1 possessed the most extended fruit. Onitsha (long) had the greatest fruit size, measuring7.33cm in breadth, while IfiteOgwari (prolific long) had the greatest weight, weighing 0.667g. The increased weight offruits in the IfiteOgwari (prolific long) accession compared to other accessions can be attributed to its more efficientutilization of sunlight through the production of a greater number of leaves and side branches, leading toimproved assimilation of carbohydrates (Yetisiret al., 2008).The variations in yield among different bottle gourd accessions appear to be dependent on the individualenvironmental conditions (Cramer and Wehner, 2000a). It is possible that the accessions used in this study did notshow enough variation in terms of fruit yieldwhich result in differences in fruit production (Cramer and Wehner, 2000a), or that theenvironmental conditions at IfiteOgwari do not allow for the manifestation of yield differences Table 5.

A simple correlation among the agronomic traits of bitter gourd accessions evaluated is presented in Table 6. From the correlation matrix, six traits which are internodal length at 6 weeks after sowing (-0.45^{*}), internodal length at 9 weeks after sowing (-0.43^{*}), number of primary branches at 6 weeks after sowing (-0.44^{*}), number of primary branches at 9 weeks after sowing (-0.57^{**}), petiole length at 6 weeks after sowing (-0.65^{**}) and petiole length at 9 weeks after sowing (-0.64^{**}), showed significant ($p<0.05$) negative correlations with fruit yield.Fruit width also showed a very highly significant (0.89^{**}) positive correlation with fruit weight. However, days to emergence (0.37), days to 50% emergence (0.32), days to 100% emergence (-0.02), vine length at 6 weeks after sowing (-0.37), vine length at 9 weeks after sowing (-0.42), peduncle length male at 6 weeks after sowing (0.12), peduncle length male at 9 weeks after sowing (0.12), peduncle length female at 6

weeks after sowing (-0.35), peduncle length female at 9 weeks after sowing (-0.28), days to 50% flowering (0.18), days to male flower initiation (0.01), days to female flower initiation (0.14) , fruit length (0.05), fruit width (0.11) and fruit weight (0.33) had no correlation with fruit yield (Table 6). However, significant positive relationship (0.45*) were obtained involving these traits; fruit width which is a yield related trait with days to female flower initiation. Thus, indicating the possibility of a form of indirect relationship existing among these traits. This implies that selection for such traits that showed positive relationship with yield would result to higher total fruit yield per hectare. This is in agreement with those of Umeh et al., (2021) and Cramer and Wehner, (2000a) who reported significant positive correlation between these traits and yield in cucumber. Negative correlations shown among the agronomic traits suggest an inverse effect on yield (Cramer and Wehner, 2000a). Umeh et al. (2019) also observed significant positive correlations between number of fruits per plant, vine length and total fruit yield per ha in cucumber. A strong positive and significant relationship between number of fruits per plant, fruit diameter and flesh thickness and total fruit yield/ha have also been reported in cucumber (Ullah et al., 2012).

Conclusion

The result of this experiment suggests that farmers and plant breeders who are seeking to produce high quality bottle gourd in terms of fruit length, weight, and yield from this Agro-ecological zone understudy should use Onitsha (round), IfiteOgwari(long), IfiteOgwari(prolific round) and IfiteOgwari(prolific long) accessions for maximum satisfying production and as well base their selection on traits that are positively correlated with yield.

Conflict of Interest Statement: The authors hereby declare that there is no conflict of interest

References

1. Cramer, C.S. and Wehner, T.C. (2000a). Fruit yield and yield component correlations of four pickling cucumber populations. Cucurbit Genetics Cooperative Report 23:12-15.
2. FAO. (2008). Grassland Index. A searchable catalogue of grass and forage legumes. FAO, Rome, Italy. Available at: www.fao.org.
3. GenStat Release 10.3DE. (2011). Discovery Edition 4 VSN International Ltd. Rothamsted Experimental Station, Howel, Hempstead, UK.
4. Jackson, M. L. (1962). Soil chemical and particle size analysis: Prentice Hall, Ince. Eagle wood Cliffs.

5. Kjeldahl, J. (1983). The Kjeldahl determine of nitrogen: retrospect and prospect. Trends in analytical Chemistry, Vol.13, No. 4 ,138p

6. Mayura, S.K., Ram, H.H., Singh, O.K. 2009. Standard heterosis for fruit yield and its components in bottle gourd Lagenariasiceraria(Mol.) Standley. Ann Horti., **2**: 72-76.
7. Okalebo, J., Kenneh W.G. and Woomer, P.L. (1993). Laboratory methods of soil and plant analysis. National Agricultural Research Centre, Muguga, Kenya.
8. Richardson, J. B. (1972). The Pre-Columbian distribution of the bottle gourd (Lagenariasiceraria): A Re-evaluation. Economic Botany, 26(3), 265-273.
9. Taffouo, V.D., Etame, J., Ndongo, D., Nguelemeni, M.L.P., Mounga, E.Y., Findjom, T.R. and Amougou, A. (2008). Effects of sowing density on growth, yield and organic compound in five cowpea (Vigna unguiculataL. Walp) cultivars. Journal of Applied Biosciences, 12: 623-632
10. Ullah, M.Z., Hassan, M.J., and Chowdhury, A.Z.M.K.A. (2012). Genetic variability and correlation in exotic cucumber (Cucumis sativus L.) varieties energy pacAgro Ltd. Monipur, Hotapara, Gazipur. Bangladesh Journal of Plant Breeding and Genetics (25) 1:17-23.
11. Umeh, O. A, Ngwuta, A.A., Onyishi, G.C and Anyanwu, C. P.. (2020, July). "Comparative Studies Of The Yield Performance Of Improved And Adapted Genotypes Of Cucumber (Cucumis Sativus L.) In Owerri, Southeastern Nigeria.", IOSR Journals (10.9790), Vol. 13, (Issue 7), pp 19-24, e-ISSN: 2319-2380, p-ISSN: 2319-2372.
12. Umeh, O. A, Ngwuta, A.A., Onyishi, G.C and Anyanwu, C. P. (2019, July). Morphological characterization of cucumber germplasm for yield andYield associated traits in owerri area southeastern nigeria. INT'L JOURNAL OF AGRIC. AND RURAL DEV.Volume 22(2), pp 4228 – 4236.
13. Walkley, A. and Black, I.A. (1934). An examination of the degtjareff method for determining soil organic matter and a proposed modification of the chromic acid titration method. Soil Science, 37:29-38.
14. Yetişir, H., M. Şakar, and S. Serçe (2008). "Collection and morphological characterization of Lagenariasiceraria germplasm from the Mediterranean region of Turkey." Genetic Resources and Crop Evolution 55: 1257-1266.

Table 1: Physicochemical properties of the soil taken from 0-20cm depth of the experimental site in UNIZIK.

Physiochemical properties	Values	Method of analysis
Physical properties		
Sand (%)	78.8	Hydrometer (Jackson, 1962)
Silt (%)	8.8	Hydrometer (Jackson, 1962)
Clay (%)	12.4	Hydrometer (Jackson, 1962)
Textural class	Sandy loam	
Chemical properties		
Organic Carbon (%)	0.78	(Walkley and Black, 1934)
Organic matter content (%)	1.34	
Total Nitrogen (%)	0.07	Kjeldahl method (1983)
Total exchangeable acidity (Cmol/kg)	1.2	
Aluminium (Cmol/kg)	0.7	
Hydrogen (Cmol/kg)	0.5	
Available phosphorus (mg/kg)	3.63	Flame photometer (Okaleboet al., 1993)
Potassium (Cmol/kg)	0.18	Flame photometer (Taffouoet al., 2008)
Sodium (Cmol/kg)	0.14	Flame photometer(Taffouoet al., 2008)
Calcium (Cmol/kg)	2.4	Flame photometer(Taffouoet al., 2008)
Magnesium (Cmol/kg)	1.6	Mehlich's method(Taffouoet al., 2008)
Soil pH (H_2O)	6.56	pH meter
Cation Exchange Capacity (Cmol/kg)	5.52	
Base Saturation (%)	78.2	

Accessions	Days to Emergence	Days to 50% Emergence	Days to 100% Emergence
Onitsha (long)	5.00	7.00	11.00
Onitsha (round)	6.00	9.00	13.00
Ekwulobia(prolific long)	6.00	8.00	13.00
Ekwulobia(round)	5.00	7.00	12.00
IfiteOgwari(long)	5.67	8.33	12.00
IfiteOgwari(prolific round)	6.00	8.00	11.33
IfiteOgwari(prolific long)	8.00	11.00	14.00
L.S.D (0.05)	0.39	0.39	0.78

Table 2: Emergence parameters of the seven bottle gourd (Lagenariasiceraria) accessions

Accession	Vine length(cm) 6WAP	Vine length(cm) 6WAP	length (cm)6WAP	length(cm) 9WAP	branches 6WAP	branches 9WAP	Length(cm) 6WAP	Length(cm) 9WAP	Length(cm) male6WAP	Length(cm) male9WAP	female6WAP	(cm)female9 WAP
Onitsha (long)	310.00	450.00	16.33	19.00	2.00	4.67	10.00	12.33	4.33	9.67	5.33	10.33
Onitsha (round)	230.00	353.30	11.00	13.67	1.67	3.67	5.67	9.00	4.67	9.00	3.33	9.67
Ekwulobia(prolific long)	330.00	503.30	15.33	18.00	2.00	4.67	10.67	13.33	4.33	9.33	4.67	9.67

Table 3: Vegetative parameters of the seven bottle gourd(Lagenariasiceraria) accessions

Ekwulobia(round)	237.00	336.70	13.67	16.00	1.33	4.67	13.33	15.33	5.67	10.00	5.33	10.00
IfiteOgwari (long)	283.00	356.70	11.00	13.33	1.67	2.33	6.33	9.00	5.00	9.67	4.33	9.33
IfiteOgwari (prolific round)	140.00	200.00	9.33	12.00	1.00	1.67	5.67	7.67	5.00	10.00	3.33	9.33
IfiteOgwari (prolific long)	60.00	140.00	5.67	7.67	1.00	1.33	4.67	6.67	5.00	9.67	2.67	8.00
L.S.D (0.05)	82.8	72.28	2.65	2.16	NS	2.41	4.09	4.56	NS	NS	1.74	1.97

Table 4: Floral parameters of the bottle gourd (Lagenariasiceraria) accessions

Accessions	Days to 50% Emergence	Days to Male Flower Initiation	Days to Female Flower Initiation
Onitsha (long)	28.33	44.33	53.00
Onitsha (round)	28.33	44.33	53.00
Ekwulobia (prolific long)	30.33	43.67	50.67
Ekwulobia(round)	28.00	44.00	53.00
IfiteOgwari(long)	29.33	42.67	53.00
IfiteOgwari(prolific round)	28.33	43.33	53.67
IfiteOgwari(prolific long)	29.67	43.33	51.00
L.S.D (0.05)	NS	NS	2.75

Table 5: Yield parameters of thebottle gourd(Lagenariasiceraria) accessions

Accessions	Fruit Length (cm)	Fruit Width (cm)	Fruit Weight (kg)	Fruit yield/Plant (ton/ha)	
Onitsha (long)	17.33	7.33	0.60	1.67	
Onitsha (round)	16.67	6.67	0.60	2.33	
Ekwulobia(prolific long)	15.67	5.33	0.133	1.67	
Ekwulobia(round)	20.33	5.83	0.267	1.33	
IfiteOgwari(long)	21.33	7.00	0.633	3.00	
IfiteOgwari(prolific round)	19.00	6.33	0.533	3.67	
IfiteOgwari(prolific long)	17.00	6.33	0.667	2.67	
L.S.D (0.05)	4.11	1.76	0.39	1.42	

Table 6. Correlation matrix of the agronomic parameters of the evaluated bottle gourd (Lagenariasiceraria) accessions.

	Days to	Days to	Days to	Vine	Vine	Internod	Internod	Number	Number	Petiole	Petiole	Peduncl	Peduncl	Peduncl	Peduncl	Days to	Days to	Days to	Fruit	Fruit	Fruit	Fruit
Days to emergence	1																					
Days to 50% emergence	.949**	1																				
Days to 100 % emergence	.788**	.809**	1																			
Vine length6 WKS	-.657**	-.658**	-.319	1																		
Vine length9 WKS	-.607**	-.607**	-.228	.952**	1																	
Internodal length6 WKS	-.786**	-.795**	-.506*	.774**	.843**	1																
Internoda	-.7	-.8	-.5	.82	.86	.97	1															

l length9 WKS	90**	12**	12*	0**	8**	4**																
Number of primary branches 6WKS	-.307	-.236	-.104	.433*	.458*	.332	.373	1														
Number of primary branches 9WKS	-.560**	-.539*	-.272	.484*	.583**	.622**	.617**	.732**	1													
Petiole length6 WKS	-.637**	-.649**	-.372	.392	.461*	.704**	.656**	.368	.686**	1												
Petiole length9 WKS	-.640**	-.634**	-.331	.446*	.520*	.713**	.668**	.371	.698**	.973**	1											
Peduncle length Male 6WKS	-.009	.048	.059	-.286	-.270	-.130	-.236	-.120	-.038	.070	.058	1										
Peduncle length	-.106	-.189	-.304	-.146	-.182	.022	-.002	-.180	.051	.169	.096	-.10	1									

Male 9WKS												8										
Peduncle length Female6 WKS	-.660**	-.656**	-.507*	.506*	.546*	.777**	.681**	.261	.552**	.785**	.786**	.065	.277	1								
Peduncle length Female9 WKS	-.618**	-.586**	-.432	.572**	.537*	.623**	.625**	.283	.448*	.450*	.455*	.024	.253	.499*	1							
Days to 50% flowering	.363	.321	.397	.066	.119	.048	.078	.108	-.176	.001	-.032	-.264	-.045	-.020	-.143	1						
Days to male flower initiation	-.038	-.077	.113	.045	.122	.040	.041	.099	.205	-.132	-.050	.316	-.319	-.040	-.017	-.390	1					
Days to female flower initiation	-.426	-.334	-.470*	-.063	-.076	.077	-.003	-.091	-.030	-.045	-.096	.442*	.037	.145	.143	-.560**	.244	1				
Fruit length(cm)	-.241	-.171	-.212	.074	-.131	-.074	-.081	.095	-.204	.078	.015	.429	-.095	.072	.099	.006	-.170	.282	1			

Fruit width (cm)	-.183	-.0777	-.4003	-.0551	-.0556	.1400	.0511	-.0226	.0002	-.0400	-.0882	-.016	.2444	.3866	.2122	-.1997	-.0777	.4533*	-.090	1		
Fruit weight(g)	.1488	.2299	-.1422	-.2711	-.3055	-.1888	-.2777	-.2214	-.2500	-.3522	-.3889	.0355	.1511	.0966	.0422	-.1822	.0211	.3776	-.057	.8911**	1	
Fruit yield per plant (ton/ha)	.3711	.3244	-.0155	-.3669	-.4199	-.4511*	-.4334*	-.4377*	-.5699**	-.6544**	-.6366**	.1244	.1223	-.3554	-.2777	.1822	.0099	.1411	.0488	.1114	.328	1