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MORPHOLOGICAL LODGE OF DESI COTTON (*GOSSYPIUM ARBOREUM* L.) GENOTYPES AND STAGE-MANAGE BY PLANTING LOG UNDER DRY TROPICAL PROSPECT

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ABSTRACT. Planting log is the most considerable factor which directly manipulates the plant traits under naturally prevailing environment. The aim of the trial was to ensure the influence of planting hiatus on the morphological cabin of Desi cotton (*Gossypium arboreum* L.) varieties under dry tropical coast. The research was carried out during 2016 on three desi cotton genotypes C_1 (FDH-512), C_2 (FDH-502), C_3 (FDH-170) under three-fortnightsowing regimes (S_1 = 15. March, S_2 = 1. April and S_3 = 15. April) at agronomy research area in the Lasbela University of Agriculture, Water and Marine Science, Uthal, Lasbela, Pakistan. Momentous results were originated for different morphological traits according to the arid environments. Significant results were observed for traits *i.e.*; number of monopodial branches, number of sympodial branches, number of capsule per plant, number of seeds per capsule, number of locules per capsule, number of seeds per locules, weight of seed per capsule, seed colour, seed yield per plant, lint percentage, root shoot ratio (%), root depth (cm) for various sowing dates and desi cotton varieties. Results of the traits like *i.e.* the number of locules and per capsule, a number of seeds per locules was yielded completely non-significant outcomes both for the diverse sowing period and desi cotton genotypes. The interaction between the both factors was found to be non-significant in all traits. The correlation amongst cotton individual characteristics was observed, it was found that capsules per plant and lint percentage, monopodial branches per plant, root shoot ratio, root depth, seed weight per capsule and seed yield per plant were significantly and positively correlated. The seed yield and lint percentage was also significantly correlated, which showed that selection may be positive responsive in sense of lint percentage, monopodial branches, seed yield per plant, capsules per plant and seed weight per capsule to get a superior yield of cotton. Under the existing dry climatic condition, it was found that the finest planting window of 15. April for the desi cotton FDH-170 is most suitable for its cultivation.

Introduction

Cotton (*Gossypium hirsutum* L.) is a significant fibre yielding crop of the world. It belongs to the family Malvaceae, grown in tropical and subtropical regions of more than 80 countries all over the world. (Balasubramniyan, Palaniappan, 2007). Cotton is an important source of earning and for foreign trade is very significant. The cotton crop share in GDP is 7.1% and account used for 1.5% in the agriculture sector. The area under cotton crop increased nearly 2961 thousand hectares from 2014 to 2015. The cotton production raised at 13.98 million bales (GOP, 2014–15).

The cotton growth and yield also depend on sowing time, if sowing is late, then its potential yield is reduced. During early sowing of the crop, the

temperature is low and it will decrease plant metabolic process (Deho *et al.*, 2012).

One of the most significant agronomic considerations for growers is to maximize yield and superiority is to select a suitable sowing time for cotton crop. The best time of cotton sowing in a particular area can often be complicated, that must strike equilibrium as it is a decision between sowing too early and lasting problems related to cold weather or sowing too late and losing possible yield. The cold weather during sowing or too early sowing can mostly slow crop growth, frequently leading to the poor establishment and poor early growth. Moreover, the many seedlings of cotton expose to diseases (Ali *et al.*, 2004). Sowing time has very significant role in realizing greatest seed cotton yield in a country like Pakistan, where the climatic impression varies from region to the province. Cotton yield can be adequately improved if the most favourable time for sowing in the exacting zone is well known. Late sowing increases the period among sowing to seedling appearance, (first square, flower, and opening boll) and plant survival also decreases. Evaluated and observed the effects of time of sowing (May 1st and 29th) on the growth and yield of cotton (F846 and desi cotton LD327). Desi cotton recorded superior values for plant height, chlorophyll and stem dry matter content, followed by American cotton. Late sowing resulted in importantly lower yield than early and optimal sowing. Ali *et al.* (2009) showed that the maximum seed cotton yield of 2039 kg ha^{-1} was obtained on May 15th sowing followed by 1669 kg ha^{-1} and 1847 kg ha^{-1} sown on May 1st and May 30th, correspondingly. For receiving high-quality seed cotton yield, cotton might plant in the month of May (Bhaskar *et al.*, 2005).

Maximum yield of cotton was not realized until that time due to many problems, such as, pest insects, weed infestation and diseases, water shortage, excessive salinity, short seed of germination , appropriate sowing methods, poor practices of soil management, premature flowers and boll shedding, too late or too early sowing on and offensive used of cultivars in special agro-ecological zones. Proper sowing instance play essential role in yield outcomes. Proposed first on trial on desi cotton was carried out below the dry tropical environmental condition of district Lasbela, Pakistan under irrigated conditions. A field experiment was conducted for the objective to assess the planting interval on the morphological features and yield of Desi cotton (*Gossypium arboreum* L.) under a dry coastal system of Lasbela, Pakistan.

Materials and Methods

Lasbela is a coastal district of Balochistan falls on the bank of Arabian Sea. It falls in the arid zones of southern Balochistan. The present field trial was conducted during 2016 at agronomy research area located near Faculty of Agriculture, Lasbela University of Agriculture, Water and Marine Science (LUAWMS) Uthal, Lasbela Pakistan. For determining soil fertility status composite soil samples were collected before sowing of the cotton and after harvesting of the cotton. The experimental soil was loamy in texture with slightly alkaline pH as given in Table 1. The experiments consisted of three genotypes of Desi Cotton (C_1 (FDH-512), C_2 (FDH-502), C_3 (FDH-170)) with a three planting pane (S_1 = 15. March, S_2 = 1. April and S_3 = 15. April). The crop was cultivated on well-prepared seed bed with dibbler methods at field capacity. The inter-row distance was 75 cm while interplant distance was 20 cm. Each of the three treatments has received a suggested and uniform dose of nitrogen (N), phosphorus (P) and potassium (K) fertilizer; applied at the rate of 120:60:60 NPK ha^{-1}. Before sowing, a uniform dose of all the amount of phosphate and potash fertilizer (source Diammonium Phosphate and Potassium Sulphate) was applied at the rate 60 kg ha^{-1}, while half nitrogen fertilizer in the form of urea was applied with first irrigation in each treatment. The leftover dose of nitrogen fertilizer was applied in two different splits, first dose after 30 days and remaining at flowering.

After first irrigation, the crops were irrigated at an interval 8 to 24 days till maturity of crop depending upon the crop requisite and climatic conditions. Weeds were controlled manually by hoeing. All the other agronomic practices were carried out uniformly in all treatments. A local climatic data was collected from meteorology department of LUAWMS. The crop was harvested on the 1. Oct. 2016.The following growth parameters *i.e.* no. of monopodial branches, no. of sympodial branches, no. of capsule per plant, no. of seed per capsule, no. of locules per capsule, no. of seed per locules, weight of seed per capsule, seed yield per plant, lint percentage (%), root shoot ratio (%), root depth (cm) and correlation amongst cotton traits were recorded by using standard procedures and statistical analyses of variance (ANOVA) by applying F variance method Fisher's analysis and Least Significant Difference (LSD) test at 5% probability level (Steel *et al.*, 1997). Statistic duration of whole crop season different month's climatic data Figure 1 (a, b) were accessed from the meteorological department situated in the vicinity of Lasbela University.

Table 1. Chemical analysis of soil sample before and after cotton harvesting

Determination		pH	Electrical conductivity, dSm^{-1}	Organic matter, %	Nitrogen, %	Phosphorus, ppm	Potassium, ppm
Sample 1	Before	7.46	1.8	0.21	0.79	2.4	0.23
	After	7.02	1.01	0.17	0.54	1.98	0.19
Sample 2	Before	7.34	1.33	0.23	0.33	1.25	0.21
	After	6.99	1.13	0.18	0.21	1.13	0.18
Sample 3	Before	7.51	1.40	0.17	0.21	1.10	0.25
	After	7.23	1.26	0.09	0.19	1.01	0.17

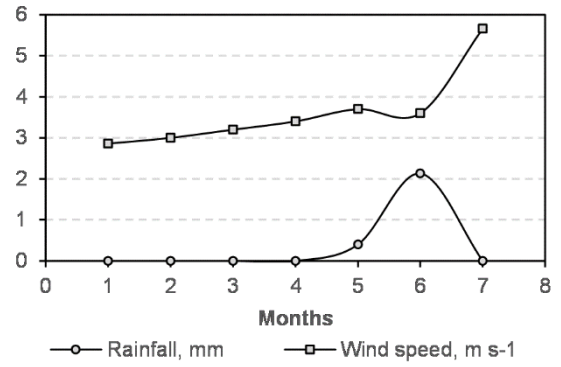

Figure 1a. Rainfall and wind speed variations during cropping season in 2016

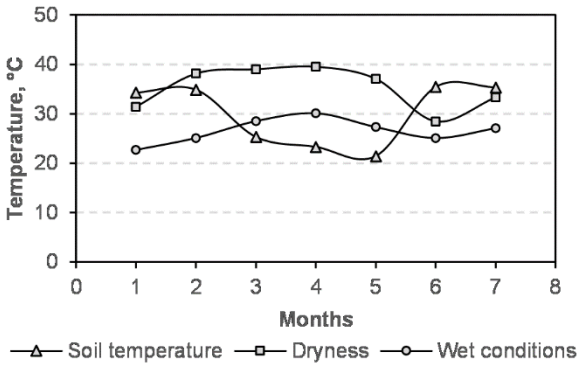

Figure 1b. Soil temperature, dryness and wet conditions variability during experimental season in 2016

Results

Number of monopodial branches per plant

According to the statistical results, monopodial branch in desi cotton was found to be significant for different sowing dates as presented in Table 2. In S_3 treatment, maximum number of monopodial branches per plant (23.0) was documented, compared to other planting dates, where less monopodial branches in S_1 and S_2 treatment was statistically at par with each other. Desi cotton influenced towards genotypes was also confirmed highly significant result as given in (Table 2). Desi cotton variety C_3 = FDH-170 produced a higher number of monopodial branches per plant (22.10). Minimum monopodial branches tendency was determined in desi cotton C_2 = FDH-502 and C_1 = FDH-512 respectively and there was no significant difference among both varieties. Main climatic factor such as temperature and photoperiod enhanced the number of branches per plant for various sowing interval and for different cotton genotypes researcher was found similar results (Aslam *et al.,* 2013).The non-significant interaction between the sowing dates and desi cotton varieties was recorded (Table 2).

Table 2. Influence of planting date and desi cotton varieties on the monopodial branches per plant

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	13.66	14.66	20.66	**16.32^{B}**
C_2 = FDH-502	15.33	18.66	21.00	**18.33^{B}**
C_3 = FDH-170	18.66	20.33	27.33	**22.10^{A}**
Mean	**15.88^{b}**	**17.88^{b}**	**23.00^{a}**	

Different capital letters (A, B) in a column and lowercase letters (a, b) in a row implicate significant difference at least 0.05 level.

Number of sympodial branches per plant

The results showed that the sowing dates impact on the number of sympodial branches in desi cotton significantly (Table 3). The highest number of sympodial branches per plant (2.67) was found in S_1 treatment as compared to other corresponding sowing time such as S_2 and S_3 treatment which was statistically at par with each other. The non-significant result was recorded by different desi cotton genotypes C_1 = FDH-512, C_2 = FDH-502 and C_3 = FDH-170 (Table 3). Vertically raised, the temperature and photoperiod enhanced the sympodial branches per plant for different sowing dates. These findings are closely related to the reports of Nehra *et al.* (1986), Aslam *et al.* (2013). The interaction between the sowing dates and desi cotton varieties was established to be non-significant (Table 3).

Table 3. Influence of planting date and desi cotton varieties on the sympodial branches per plant

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	2.33	2.66	1.66	**2.22$_{A}$**
C_2 = FDH-502	3.00	1.66	2.66	**2.44$_{A}$**
C_3 = FDH-170	2.66	1.66	1.33	**1.89$_{A}$**
Mean	**2.67^{a}**	**2.00^{b}**	**1.89^{b}**	

Similar capital letter A in the column indicate *P > 0.05* and lowercase letters (a, b) in row implicate significant difference at least 0.05 level.

Number of capsule per plant

Results in Table 4 proved that sowing dates were highly significant for a number of capsules per plant in desi cotton. The treatment S_3 was relentedgreatest number of capsule per plant (34.00) as compared to another sowing which was followed by S_2 treatment. Least numbers of capsule per plant (23.33) were examined in S_1 treatment. As for as desi cotton genotypes comparisons were also established very significant result as specified in Table 4. Desi cotton array C_3 = FDH-170 generated a superior number of capsule per plant (33.56) and the second tendency was followed by cotton C_2 = FDH-502 as contrasted to lowest (23.00) in cotton selection C_1 = FDH-512. Regularly increased temperature and daylenght enhanced the additional numbers of capsules per plant in various sowing intervals and cotton genotypes. These results are comparable to another report of Awan *et al.* (2011). Interaction amongst the sowing dates and desi cotton assortments was instituted to be non-significant (Table 4).

Table 4. Influence of planting date and desi cotton varieties on the number of capsule per plant

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	18.00	19.33	31.66	**23.00^{C}**
C_2 = FDH-502	24.66	27.33	30.66	**27.22^{B}**
C_3 = FDH-170	28.33	32.66	39.66	**33.56^{A}**
Mean	**23.33^{c}**	**26.44^{b}**	**34.00^{a}**	

Different capital letters (A, B, C) in a column and lowercase letters (a, b, c) in a row implicate significant difference at least 0.05 level.

Number of seeds per capsule

Number of seeds in each capsule in desi cotton was statistically significant for sowing dates (Table 5).The maximum number of seeds per capsule (28.67) was produced in S_1 treatment compared to S_2 and S_3. There was no significant dissimilarity for seed number in each capsule respectively, but lowest as compared to (S_1 = 15. March).Non-significant results were found in desi cotton genotypes for seed account in each capsule. It statistically resulted in similar findings. The pronounced effect of climatic factors was observed on different planting interval but in the case of cotton varieties there was no notable effect was noticed. These results are reported similar by (Aslam *et al.,* 2013). Data in (Table 5) showed that interaction with the sowing dates and desi cotton varieties was set up non-significant.

Table 5. Influence of planting date and desi cotton varieties on the number of seeds per capsule

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	26.00	20.00	26.66	**24.22^{A}**
C_2 = FDH-502	31.33	22.66	24.89	**26.11^{A}**
C_3 = FDH-170	28.66	25.66	24.00	**26.11^{A}**
Mean	**28.67^{a}**	**22.78^{b}**	**25.00^{b}**	

Similar capital letter A in columns indicate *P > 0.05* and lowercase letters (a, b) in rows implicate significant difference at least 0.05 level.

Number of locules per capsule

Quantities of locules per capsule were found to be non-significant for both various sowing dates and desi cotton genotypes (Table 6).A number of locules per capsule in desi cotton is fundamental for its genetic characters of each variety in which no alteration was concluded due to different sowing dates and variable climatic factors. The interaction among the sowing dates and desi cotton varieties was found to be anon-significant for number of locules per capsule (Table 6).

Table 6. Influence of planting date and desi cotton varieties on the number of locules per capsule

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	3.00	3.33	3.66	**3.33^{A}**
C_2 = FDH-502	3.33	3.66	3.33	**3.56^{A}**
C_3 = FDH-170	3.33	3.66	3.33	**3.44^{A}**
Mean	**3.33^{a}**	**3.44^{a}**	**3.56^{a}**	

Similar capital letter A in a column and lowercase letter a in row implicate non-significant difference at least 0.05 level.

Number of seeds per locule

Table 7 specifies the non-significant difference for the number of seeds per locule indifferent sowing dates (S_1, S_2 and S_3 treatment) and desi cotton genotypes (C_1 = FDH-512, C_2 = FDH-502, C_3 = FDH-170). Genetic traits were strongly determined that there was no change in number of seeds per locule if they are planted at different times and under variable climatic conditions. Seilsepour *et al.* (2012) were reported similar findings. Relations between the sowing dates and desi cotton varieties were existed to be non-significant.

Table 7. Influence of planting interval and desi cotton varieties on the number of seeds per locules

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	7.66	7.66	8.00	**7.78^{A}**
C_2 = FDH-502	8.66	8.00	7.33	**8.00^{A}**
C_3 = FDH-170	6.66	8.66	9.00	**8.11^{A}**
Mean	**7.67^{a}**	**8.11^{a}**	**8.11^{a}**	

Similar capital letter A in a column and lowercase letter in a row implicate non-significant difference at least 0.05 level.

Seeds weight per capsule

The results according to planting dates demonstrated that the weight of the seeds per capsule was statistically significant (Table 8). The treatment S_3 showed highest weight of seeds per capsule (2.07 g) which was followed by S_2 and S_1 treatment. Desi cotton varieties effect was yielded non-significant outcomes.

Table 8. Influence of planting date and desi cotton varieties on the weight (g) of seeds per capsule

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	1.79	1.86	2.03	**1.90^{A}**
C_2 = FDH-502	1.87	1.92	2.05	**1.94^{A}**
C_3 = FDH-170	1.78	1.96	2.12	**1.95^{A}**
Mean	1.81^{b}	1.91^{b}	2.07^{a}	

Similar capital letter A in a column indicate *P > 0.05* and lowercase letters (a, b) in a row implicate significant difference at least 0.05 level.

Steady increasing temperature and other climatic factors enhanced the weight of seeds per capsule. Seilsepour *et al.* (2012) were accounted corresponding findings. Interaction among the sowing dates and desi cotton varieties was found to be non-significant.

Seed yield per plant

A significant effect of sowing dates was observed for the seed yield per plant in desi cotton (Table 9). The treatment S_3 was fabricated highest seed yield per plant (154.56 g) which was followed by second sowing date (S_2 = 1. April). Lowest seed yield per plant (143.83 g) were screened in treatment S_1 as compared to another sowing interval. Effect of desi cotton genotypes on seed yield per plant was non-significant. Seed yield per plant was greatly influenced by climatic factors, especially temperature in various cultivation times. Similar outcomes are publicizedin report of Ali *et al.* (2003). Interaction among the sowing dates and desi cotton varieties was found to be non-significant.

Table 9. Influence of planting interval and desi cotton varieties on the seed yield per plant (g)

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	142.58	150.63	154.78	**149.33^{A}**
C_2 = FDH-502	144.02	146.67	154.43	**148.37^{A}**
C_3 = FDH-170	144.90	150.80	154.46	**150.05^{A}**
Mean	**143.83^{c}**	**149.36^{b}**	**154.56^{a}**	

Similar capital letter A in a columns indicate *P > 0.05* and lowercase letters (a, b, c) in a row implicate significant difference at least 0.05 level.

Lint percentage

Sowing dates results showed that lint percentage in desi cotton was statistically significant (Table 10). Maximum lint percentage (40.41%) was yielded per plant in treatment S_3 which was followed by S_2 sowing. Lowest lint percentage (32.29%) was noted in S_1 treatment. Lint percentage was showed non-significant results for desi cotton varieties C1 = FDH-512, C_2 = FDH-502 and C_3 = FDH-170. Increasing temperature and daylight enhanced the lint percentage per plant for different sowing times, but showed no influence over the cotton varieties. Interaction among the sowing dates and desi cotton varieties was found to be non-significant. Seilsepour *et al.* (2012) were reported corresponding findings.

Table 10. Influence of planting date and desi cotton varieties on the lint percentage (%)

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	32.22	34.61	39.96	**35.60^{A}**
C_2 = FDH-502	30.71	35.43	40.48	**35.54^{A}**
C_3 = FDH-170	33.94	36.74	38.78	**37.15^{A}**
Mean	**32.29^{c}**	**35.59^{b}**	**40.41^{a}**	

Similar capital letter A in a column indicate *P > 0.05* and lowercase letters (a, b, c) in a row implicate significant difference at least 0.05 level.

Root shoot ratio

Sowing times showed that the root shoot ratio in desi cotton was statistically highly significant (Table 11). Highest root shoot ratio (4.51%) was located in S_3 treatment sowing and similar trends were followed by S_2 treatment. Lowest root shoot ratio (2.79%) was found in S_1 treatment. Desi cotton genotypes effect was also confirmed significant end results as shown in Table 11. Desi cotton variety C_3 = FDH-170 turned out higher root shoot ratio (4.70%) and that propensity was recounted by cotton genotype C_2 = FDH-502. As distinguish to lowest (2.40%) root shoot ratio in cotton variety by C_1 = FDH-512. Gradual increasing temperature and photoperiod enhanced the number of branches per plant, so plants interval strongly influenced the cotton sowing. These conclusions are exposed by similar description of Seilsepour *et al.* (2012). The interaction between the sowing dates and desi cotton varieties was found to be non-significant.

Table 11. Influence of planting date and desi cotton varieties on the root shoot ratio (%)

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	1.39	2.07	3.09	**2.41^{C}**
C_2 = FDH-502	2.70	4.09	4.36	**3.72^{B}**
C_3 = FDH-170	4.29	4.04	5.43	**4.71^{A}**
Mean	**2.79^{b}**	**3.52^{b}**	**4.51^{a}**	

Different capital letters (A, B, C) in a column and lowercase letters (a, b) in a row implicate significant difference at least 0.05 level.

Root depth

Non-significant results were recorded for root depth (cm) in desi cotton for different sowings (Table 12). Influence of desi cotton varieties on root depth was significant as given in Table 12. Desi cotton variety C_3 = FDH-170 was provided higher root depth (23.27 cm) and this tendency was followed by cotton genotype C_2 = FDH-502. As contrasted to the lowest root depth (69.30 cm) noted in cotton variety C_1 = FDH-512. Generally, a non-significant influence of climatic factors was observed for three sowing dates (Table 12), while it is significant for cotton genotypes. Interaction among the sowing dates and desi cotton varieties was found to be non-significant. These conclusions are exposed similar description of Ali *et al.* (2011).

Table 12. Influence of planting date and desi cotton varieties on the root depth (cm)

Varieties	Sowing date			
	S_1 = 15. March	S_2 = 1. April	S_3 = 15. April	**Mean**
C_1 = FDH-512	73.48	66.23	68.23	**69.31^{B}**
C_2 = FDH-502	71.15	74.46	72.75	**72.79^{B}**
C_3 = FDH-170	82.16	82.16	85.05	**83.27^{A}**
Mean	**75.69^{a}**	**74.22^{a}**	**75.46^{a}**	

Different capital letters (A, B) in a column and lowercase letters (a, b) in a row implicate significant difference at least 0.05 level.

Correlation among characteristics of desi cotton

The judgment of Table 13 confirmed the correlations amongst cotton traits. It was found that capsules per plant and lint percentage, monopodial branches per plant, root shoot ratio, root depth, seed weight per capsule and seed yield per plant were significantly and positively correlated with each other.

Table 13. Correlation of different yield and yield characteristics of desi cotton

Traits	CupPP	Lint	LuPCup	MBP	RSRatio	Rdepth	SPB	SPCup	SWPCup	SPLu
Lint	0.622*									
LuPCup	0.105	0.103								
MBP	0.923*	0.565*	0.043							
RSRatio	0.828*	0.489*	0.111	0.788*						
Rdepth	0.490*	0.147	–0.131	0.527*	0.568*					
SPB	–0.378*	–0.399*	0.320*	–0.343*	–0.332*	–0.355*				
SPCup	0.007	–0.252*	0.414*	–0.058	–0.012	–0.025	0.348*			
SWPCup	0.582*	0.400*	0.180	0.650*	0.469*	0.084	–0.114	0.213		
SPLu	0.241*	0.150	0.154	0.161	–0.129	0.030	–0.223	0.019	0.156	
SYP	0.514*	0.653*	0.074	0.448*	0.410*	–0.107	–0.251*	–0.252*	0.470*	0.206

* = significant at 5% probability level; Lint = Lint Percentage, CupPP = Capsule per plant, LuPCup = Locules per capsule, MBP = Monopodial branches per plant, SPB = Sympodial branches per plant, SPCup = Seeds per capsule, RSRatio = Root shoot ratio, RDepth = root depth, SWPCup = Seed weight per capsule, SYP = seed yield per plant, SPLu = seeds per locule

The well-emerged correlation between capsules per plant and monopodial branches per plant showed that the cotton various traits may use to improve cotton yield. The seed yield and lint percentage were also significantly correlated, which showed that selection may give positive response in sense of lint percentage, monopodial branches, seed yield per plant, capsules per plant and seed weight per capsule to get a better yield of cotton.

Discussion

Cotton is a fibre crop in Pakistan. Also more than 70% of edible oil requirements meet by cotton seed in Pakistan. Plant growths mostly rely on environmental factors, changes in weather condition, management, genotypes characteristics and planting pattern. Weather is the foremost feature of crop growth and yield in any particular area and it diverges from small scale to large agro-ecological zone (Manjunatha *et al.,* 2010). The weather features like rainfall, soil temperature, and wind speed, dry and wet conditions of the soil considerably change during the whole planting seasons as shown in different graph curve by Stepan *et al.* (2004). Rainfall and temperature during the whole planting season promote generally all the genotypes influenced by planting time under the dry coastal tropical environments (Saranga, 2001). However, the best cultivation time of desi cotton (*Gossypium arboreum* L.) is 15. April under existing environment conditions. Growth behaviour and yield components of desi cotton (FDH-170) were uppermost in the case of planting at 15. April. Remaining two planting dates of desi cotton, such as 15. March and 1. April, has showed no significant results as compared to the 15. April sowing which was closely related to (Munir *et al.,* 2015; Nadeem *et al.,* 2010). A significant result was observed for different traits, such as number of monopodial branches, number of sympodial branches, number of capsule per plant, number of seeds per capsule, number of locules per capsule, number of seeds per locules, Weight of seeds per capsule, seeds yield per plant, lint percentage, root shoot ratio, root depth for various sowing dates and desi cotton varieties (Saleem *et al.,* 2011; Jagtap *et al.,* 2010; Ghule *et al.,* 2013). Findings of the traits like a number of locules and seeds per capsule, the number of seeds per locules was yielded non-significant outcomes both of the diverse sowing periods (Usman *et al.,* 2016) and desi cotton genotypes (Savakumariand, Mohan, 2009).The interaction between the both studied factors was found to non-significant in all traits. The correlation amongst cotton individual characteristics was observed, it was checked that capsules per plant and lint percentage, monopodial branches per plant, root shoot ratio, root depth, seed weight per capsule and seed yield per plant were significantly and positively correlated (Savakumari, Mohan, 2009). The strong correlation between capsules per plant and monopodial branches per plant showed that the within desi cotton an assortment of traits may be helpful to enhance the cotton yields (Nadeem *et al.,* 2010; Brar *et al.,* 2015). The seed yield and lint percentage were also significantly correlated which showed that selection may give positive response in sense of lint percentage, monopodial branches, seed yield per plant, capsules per plant and seed weight per capsule (Jagtap *et al.,* 2010; Ghule *et al.,* 2013; Deho *et al.,* 2012; Brar *et al.,* 2015) to get superior yield of cotton.

Conclusion

Generally, all the genotypes were influenced by planting time under the dry coastal tropical environments. However best sowing time for the cultivation of desi cotton (*Gossypium arboreum* L.) is 15. April. Growth traits and yield components of desi cotton (FDH-170) were boosted highly in a crate of planting at 15. April. Additional two planting dates of desi cotton such as 15. March and 1. April showed no significant results compared to the 15. April sowing.

Conflict of interest

The research is focus on desi cotton cultivation under dry tropical environment in the vicinity of the coast of the Arabian Sea in contrast to the sub tropical environment generally.

Author contributions

Involve in the proposal writing, conducting research, collection of data, interpretation of results and discussion and work as post graduate student. Approve the final manuscript: KJ.
Planned research and provide guidelines throughout the study. Act as a supervisor and corresponding author: MW.
Help in data arrangement and provide guideline during statistical analysis: DMB.
Guide during proposal development and traits selection: TK.
Contribute in application of statistical analysis: MAK
Help in manuscript drafting: MR.
Interpret the data and critical revision: QA

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