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SHORT COMMUNICATION

STUDIES ON GROWTH, PHENOLOGY AND PRODUCTIVITY OF DIFFERENT COTTON GENOTYPES

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A field experiment was conducted to study the phenology and yield potential of different plant types of cotton genotypes under rainfed conditions. Among the robust types RAHB-61 was early to 50% square formation, 50% flowering, 50% boll opening and maturity. In compact types RACH-11 was early to 50% square formation, 50% flowering, 50% boll opening and maturity. *G. herbaceum* genotypes took more number of days for 50% square formation, 50% flowering, 50% boll opening and maturity. Robust genotypes produced higher seed cotton yield, TDM and yield components followed by compacts and *G. herbaceum* genotypes. The results revealed that compact genotypes are early in days to 50% boll opening and days to maturity as compared to robust and *G. herbaceum* genotypes.

Key words **: Cotton, leaf area, phenology, specific leaf weight.**

Varietal differences in dry matter accumulation and its partitioning into reproductive parts were observed in cotton genotypes (Nagabhusan *et al.* 1993, Unruh and Silvertooth 1996). Yield of seed cotton is however, dependent on many factors, of which, the rate of flowering, the length of flowering period, the number of bolls per plant and boll weight are important. In the present investigation an attempt has been made to study phenology, morphology, productivity of different cotton genotypes.

A field experiment was carried out during the *kharif* season of 1998-99 at Agrictultral Research Station, University of Agricltural Science, Dharwad, to study the production potential of different plant types in cotton genotypes. Total number of days from the date of sowing to the date on which 50 per cent of the plants initiated squaring, flowering and boll opening was recorded. The number of days required from sowing to the date of last picking was considered for days to physiological maturity. Mean boll weight and seed cotton yield was recorded. Harvest index was calculated by using the formula of Donald (1962). The specific leaf weight or the leaf thickness was determined by dividing leaf dry weight with reform and expressed as mg dm^{-2} . Leaf area was measured by disc method as suggested by Vivekanandan *et al.* (1972). For estimation of total dry matter samples were dried at 80°C.

Fischer's method of analysis of variance was applied for the analysis of the data and interpretation of the results was carried out. The level of significance used in 'F' and 't' tests was P = 0.05. Critical difference (CD) values were calculated at 5 per cent probability level, whenever 'F' test was significant.

The data on phenological characters are presented in Table 1. The number of days of 50 per cent squaring differed significantly among the genotypes. Squaring was significantly early in RAHB-61 (47.7 days) and was at par with DCH-3.2 (48.7 days) and RAMPBS-155 (49 day) but there was a significant delay in DB-3-12 (70 days). The number of days to 50 per cent flowering was significantly early in DHB 105 (68.3 days) and at par with NHH-44 (69 days), RAHB-61 and RAH-100 with similar days (70 days). There was a significant delay in DB-3-12 (96 days).

Boll opening was early in three genotypes RACH-11, CPD-448 and RAHB-61 (137 days) and was at par with RACH-2 (137.3 days) and Anjali (138 days). Significantly delayed values were recorded in DB-3-12 (174.7 days). Physiological maturity was significantly early in cv. RACH-11 (168 days) followed by cv. RACH-2, CPD-448, Abadhita pocessing same number of days (169.3 days) and DHH-11 and RAHB-61 (170 days). In cv. DB-

Table 1. Genotypic variation in phenology. specific leaf weight (mg dm^{-2}), leaf area (dm^2 $plant^{-1}$), total dry matter (g $plant^{-1}$) and yield in cotton.

Genotypes	Days to 50% squaring	Days to 50% flowering	Days to 50% boll opening	Days to maturity	Yield (kg/ha)	Boll weight (g)	Number of bolls per plant	HI (%)	SLW	Leaf area	TDM
Robust									**120 DAS**	**120 DAS**	**120 DAS**
DHH-11	52.0	78.7	138.3	170.0	1395.50	4.77	42.10	35.88	1050.1	58.76	152.52
DHH-542	49.3	72.7	140.7	172.7	1217.00	4.74	35.87	34.89	1019.6	59.13	150.92
DHB-105	51.0	68.3	140.0	176.0	1084.66	3.06	30.20	34.51	957.7	58.23	143.74
RAHB-61	47.7	70.0	137.0	170.0	1025.13	2.95	28.40	33.62	873.5	56.19	132.36
DHB-290	51.0	70.7	139.0	173.7	998.68	3.09	29.37	33.77	968.3	55.29	132.43
RAH-100	51.3	70.0	139.7	174.3	947.77	4.19	19.27	31.99	789.7	54.31	110.64
Abadhita	54.3	72.0	138.3	169.3	925.93	3.77	27.40	31.01	858.9	55.75	115.61
NHH-44	49.7	69.0	138.3	172.0	793.66	3.93	17.47	29.89	729.2	54.39	99.86
DCH-32	48.7	70.3	140.7	174.0	740.74	3.30	24.40	30.58	768.5	56.73	125.58
RAHB-51	50.3	73.0	138.0	174.0	667.99	3.53	20.23	27.89	958.0	40.23	92.89
RAHH-133	52.3	79.0	139.3	171.0	562.17	4.42	21.17	28.54	828.3	40.51	85.52
RAMPBS-155	49.0	71.3	139.0	172.7	522.49	4.32	14.80	29.09	889.7	35.63	75.84
Mean	**50.6**	**72.1**	**139.0**	**172.4**	**906.81**	**3.84**	**25.89**	**31.81**	**890.9**	**52.10**	**118.16**
Compact											
RACH-2	52.3	74.3	137.3	169.3	1071.43	4.35	19.20	30.01	913.8	28.31	66.35
CPD-448	55.0	76.7	137.0	169.3	925.93	4.11	11.97	29.09	919.1	23.87	63.13
RACH-11	50.0	71.3	137.0	168.0	773.81	4.40	18.40	25.50	900.9	25.38	60.22
Anjali	51.2	73.0	138.0	170.0	753.97	4.33	12.93	24.87	887.6	33.14	59.78
Mean	**52.2**	**73.8**	**137.3**	**169.2**	**881.29**	**4.30**	**15.63**	**27.37**	**905.4**	**27.68**	**62.37**
G. herbaceum											
Jayadhar	60.0	95.0	169.3	208.3	423.28	2.80	11.10	11.52	685.2	30.43	59.14
RAHS-130	69.0	90.7	168.0	210.0	337.30	2.69	11.27	9.75	690.5	31.14	58.68
RAHS-14	64.0	94.0	171.0	211.3	304.23	2.84	11.40	9.37	682.2	31.87	59.29
DB-3-12	70.0	96.0	174.7	214.0	284.39	2.70	10.17	9.11	680.0	26.41	51.23
Mean	**65.8**	**93.9**	**170.8**	**210.9**	**337.30**	**2.76**	**10.99**	**9.94**	**684.5**	**30.00**	**57.09**
Grand Mean	**54.3**	**76.8**	**145.1**	**179.6**	**787.70**	**3.72**	**20.89**	**27.20**	**852.5**	**42.79**	**94.79**
S.Em±	0.80	0.73	0.95	1.31	51.58	0.12	1.74	1.57	25.07	2.07	7.48
CD at 5%	2.29	2.10	2.72	3.76	147.71	0.35	4.99	4.49	71.79	5.92	21.42

3-12 significantly delayed maturity was recorded (214 days). All the late maturing genotypes took more number of days for 50 per cent squaring, 50 per cent flowering, 50 per cent boll opening and maturity. On the other hand, the genotypes DHH-11, DHH-542, DHB-105, RACH-2 took relatively lesser days for 50 per cent squaring, 50 per cent flowering, 50 per cent boll opening and maturity and produced higher seed cotton yield compared to late maturing varieties. These findings are supported by the earlier studies of Ahlawat (1979), Fry (1985) and Yu and Huang (1990). Earliness appears to have a distinct advantage under rainfed conditions since early maturity genotypes got less exposure to stress compared to late maturing genotypes.

The genotypes differed significantly with respect to yield and yield components (Table 1). The cultivar DHH-11 recorded significantly higher yield (1395.5 kg^{-1} ha), boll weight [4.77 g^{-1} boll, number of bolls $plant^{-1}$ [42.10] and Harvest index [35.88%] followed by DHH-542 and

DHB-105. Where as DB-3-12 produced lower yield (284.39 kg ha^{-1}), boll weight (2.70 g $boll^{-1}$), number of bolls per plant [10.17] and Harvest index [9.11%]. The present study also revealed that the robust genotypes produced significantly higher yield than compact and *G. herbaceum* genotypes. The late maturing *G. herbaceum* genotypes produce significantly lower yield and this occured particularly due to low mean values of yield components. Leaf area was significantly higher in DHH-542 (59.13 dm^2 $plant^{-1}$) and DHB-105 (34.87 dm^2 $plant^{-1}$). Lowest leaf area was found in CPD-448 (23.87 dm^2 $plant^{-1}$) and Anjali (10.31 dm^2 $plant^{-1}$). The results indicated that in general, all the robust genotypes recorded highest total dry matter as compared to compact and *G. herbaceum* genotypes (Table 1). Nagabhushana *et al.*, (1993) have reported similar trends on drymatter and yield productivity. The present study revived that robust genotypes were early possessing higher dry matter, leaf area, specific leaf weight and yield as compared to compact and *G. herbaceum* genotypes.

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