

STUDIES ON PERFORMANCE OF DIFFERENT SPECIES OF COTTON UNDER DRY FARMING CONDITIONS

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Experiments were conducted at Cotton and Millets Experiment Station, Kovilpatti during 1982-83 and 1983-84 in black soil to study the performance of different species of cotton under rainfed condition. Results indicated that, even though the trend was not significant during 1982-83, with a crop period rainfall of 390mm, arboreum cotton recorded maximum kapas yield of 1401 kg/ha, followed by hirsutum Cotton (1349 kg/ha). With a crop period rainfall of 780 mm during 1983-84 raising of pure crop of hirsutum alone found to record significantly higher yield of 1620 kg/ha. Under the above two situations of rainfall, the treatment of mixing the seeds of arboreum cotton 25 percent + herbaceum cotton 25 percent + hirsutum cotton 50 percent was found to record maximum kapas yield.

The monsoonic rains play a vital role in increasing crop production. The quantum and distribution of North East Monsoon decide the success of crop production in vertisols of drylands of Kovilpatti region. Even though vertisol is reported to have 55% water holding capacity, the magnitude of dry spell decides the ultimate crop yield. Two dry spells of 20-25 days each, are quite common in this tract. Taking the risk, the farmers modify the cultivation practices to tide over the above situation. Even then, failures of crop occur frequently. Farmers of this tract generally raise crops like, cotton, bajra, sorghum, pulses and sunflower during North - East monsoon season. If rainfall distribution is proper, a minimum of 5 quintals of cotton kapas/ha is obtained, while failure of monsoon results

in the reduction of yield to the tune of 4 q/ha. Santhanam (1976) reported that systems of practicing intercropping and mixed cropping is beneficial against crop failure and low yield in rainfed areas. Hence with a view to study the performance of different spp. of cotton mixed in different proportions under rainfed conditions, an experiment was carried out.

MATERIALS AND METHODS

Experiments were conducted at Cotton and Millets Experiment Station, Kovilpatti during 1982-83 and 1983-84 with different species of Cotton (*G. herbaceum*, *G. arboreum* and *G. hirsutum*) at various proportions during North East monsoon season. The soil type is deep black cotton soil. The treatments tried were as follows:

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2. Assoc. Professor (Agronomy)
3. Professor (Agr. Botany).
4. Professor & Head.

Cotton and Millets Experiment Station, Kovilpatti.

- T 1. *G. herbaceum* (DB 3-12) alone.
 T 2. *G. arboreum* (K9) alone
 T 3. *G. hirsutum* (KC 1) alone
 T 4. *G. arboreum* 1 row + *G. herbaceum* 2 rows + *G. hirsutum* 1 row.
 T 5. *G. arboreum* 2 rows + *G. herbaceum* 1 row + *G. hirsutum* 1 row
 T 6. *G. arboreum* 1 row + *G. herbaceum* 1 row + *G. hirsutum* 2 rows.
 T 7. Mixture of *G. arboreum* 25% + *G. herbaceum* 50% + *G. hirsutum* 25%
 T 8. Mixture of *G. arboreum* 50% + *G. herbaceum* 25% + *G. hirsutum* 25%
 T 9. Mixture of *G. arboreum* 25% + *G. herbaceum* 25% + *G. hirsutum* 50%

randomised block design with four replications. Broad beds and furrows of 120 cm width with furrows of 30 cm width and 15 cm depth on either side were formed and the seeds were sown in lines with a spacing of 45x15 cm. The seeds were sown on 30-9-1982 (1982-83) and 20-9-1983 (1983-84). Plant population was maintained uniformly in all the treatments in both the years trials. A fertilizer dose of 40 kg N and 20 kg P₂O₅/ha was adopted uniformly to all the treatments. Six pickings were taken up from 7-2-1983 during 1982-83 while four pickings were taken up from 17-3-1984 for 1983-84. The quantum of rainfall received during the cropping season is furnished in in Table 1.

The experiment was conducted in

TABLE 1 Rainfall during cropping season (mm)

Month	Rainfall (mm)		30 Years mean
	1982-83	1983-84	
October	218.6	203.7	180.9
November	110.7	167.3	166.9
December	55.1	60.3	65.3
January	—	53.5	17.9
February	—	98.1	14.5
March	—	145.5	24.3
April	—	58.4	72.6
Total :	385.4	786.8	—

TABLE 2. Yield of Cotton Kapas

Treatment	Yield of kapas kg/ha		
	1982-83	1983-84	Mean
T1	1192	152	672
T2	1401	680	1040
T3	1349	1622	1485
T4	1223	615	919
T5	1230	654	942
T6	1112	864	988
T7	1113	676	895
T8	1191	732	962
T9	1343	1018	1180
SE	149.34	58.5	
CD (P=0.05%)	—	171.0	

The data of 1982-83 trial indicated that eventhough the yield differences between the treatments were not significant, sowing of *G. arboreum* (K9) alone was found to record higher yield of 1401 kg/ha, followed by *G. hirsutum* alone which recorded 1349 kg/ha. Among the different mixtures tested, mixing of *G. arboreum* 25% + *G. herbaceum* 25% + *G. hirsutum* 50% recorded an yield of 1343 kg/ha. During 1983-84 the treatment differences were statistically significant. Raising of *G. hirsutum* alone recorded the highest kapas yield of 1620 kg/ha, followed by mixing of *G. arboreum* 25% + *G. herbaceum* 25% + *G. hirsutum* 50% which recorded 1018 kg/ha. This treatment was on par with treatment, *G. arboreum* 1 row + *G. herba-*

ceum 1 row + *G. hirsutum* 2 rows (864 kg/ha). The higher yield obtained from *G. arboreum* during 1982-83 showed its adoptability to low rainfall conditions. This may be due to very deep root system which extracted the moisture from the lower layers as compared to *hirsutum* cotton and *herbaceum* cotton. Dharmalingam *et al.* (1979) reported a higher yield potential of K9 Cotton even in drought and adverse seasons, proves its adoptability to drought prone areas. During 1983-84 the result was entirely in favour of *hirsutum* cotton. With the receipt of high rainfall of 786.8 mm. during the cropping period, *hirsutum* cotton alone found to record significantly higher yield than *arboreum* alone. Parmar *et al.* (1978)

reported that higher yield in *hirsutum* was obtained under rainfall of 564 mm. Timely good rainfall in September, October and November helped to invigorate the reproductive phase. This was due to no moisture stress prevailed during the cropping season. It was also reported that *hirsutum* cotton found to record higher yield under no moisture stress than arboreum cotton. Eventhough, under moisture stress K9. recorded higher yield during (1982-83), under no moisture stress *hirsutum* cotton record higher yield. Mixing the seeds of *G. arboreum* 25 % + *G. herbaceum* 25%+ *G. hirsutum* 50 % found to record higher yield among the different proportions studied under the above two different situations. This was mainly due to the moisture extraction capacity of *arboreum* and *hirsutum* cotton roots at different layers of soil. (The lesser yield during 1983-84 compared to 1982-83 was mainly due to

shedding of squares due to continuous rain.* Boll sheeding was more in respect of *arboreum* and *herbaceum* cotton than *hirsutum*) The two years yield data were pooled and analysed statistically. It was found that there was significant difference between the years studied, while there was no significant difference between the treatments. The pooled mean data indicated that raising *hirsutum* cotton alone recorded maximum yield of 1485 kg/ha followed by mixing the seeds of *G. arboreum* 25 % + *G. herbaceum* 25 % + *G. hirsutum* 50 % (1180 kg/ha). The performance of *herbaceum* cotton was very poor compared to *arboreum* and *hirsutum* cotton in both the years. It can be concluded that in rainfed black soils of Kovilpatti region sowing the seeds of *arboreum*, *herbaceum* and *hirsutum* cotton in 25:25:50 ratio will result in higher and profitable yield.

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