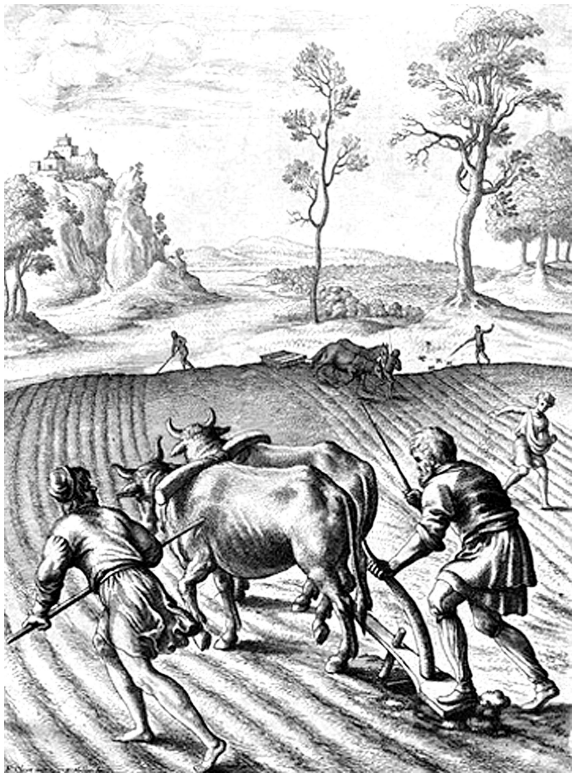
ISSN : 1812-5379 (Print)
ISSN : 1812-5417 (Online)
http://ansijournals.com/ja

JOURNAL OF AGRONOMY



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Journal of Agronomy 3 (4): 301-304, 2004
ISSN 1812-5379

Determinations of Some Agronomical and Technological Properties on Cotton Having Different Colors Fiber

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Abstract: This study was conducted according to Randomised Blocks experimental design with 4 replications in the University of Dicle, Faculty of Agriculture in Experimental Field in the years of 2001-2002 in Diyarbakır, Turkey. In the study, brown, light-brown, green fibered cotton lines and Ogosta 644, Beliizvor 432 (white fibered) varieties provided from Nazilli Cotton Research Institute and the region's standard cotton variety Sayar 314 were used for material. According to variance analysis for two years related to some agronomical and fiber technological properties of natural colored cotton lines examined the study, Ogosta 644 (90.44 cm) had the highest plant height and this variety was followed genotype with green fiber (90.28 cm) and Beliizvor 432 (89.46 cm). Sayar 314, the region's standard variety, was highest in point of number of bolls (22.00 number plant^{-1}), ginning percentages (39.47 %) and seed cotton yield (3907.5 kg ha^{-1}). In point of fiber length variety Beliizvor 432 (30.02 mm), point of fiber fineness genotype with green fiber (2.87 mic) and in point of fiber strength variety Sayar 314 (33.41 g tex^{-1}) gave better results compared with the other varieties and cotton lines.

Key words: Cotton, naturally-colored cottons, brown colored cotton, green colored cottons

INTRODUCTION

It was determined that colored cotton's agriculture gaining importance in recent years was made in Pakistan, Egypt and Peru in the years of B.C. 2700s. In these places, it was encountered cotton in brown, yellowish-brown, green and reddish-brown fiber. With the starting of industrial revolution, loams for weaving began to widespread and long and white fibered cotton took the place of natural colored short fibered cotton. Because white and long fibered cotton was weaved in a better and easy way on industrial loams. Agriculture of natural colored varieties, turning into losing gradually, has almost disappeared until Sally Fox rediscovered the brown fibered cotton in 1982. Sally Fox later expended great effort to be able to reform colored long fibred cotton for having a goal of commercial in his studies and he reformed natural colored cotton which has strong and long fiber appropriate for technological weaving, named Foxfibre at the and of his studies continuing about ten years[1].

In this time, the production of natural colored cotton is limited with some countries such as USA, China, Australia, Peru, France and India. A few toxic chemicals including heavy metals are used in the painting and coming out white of white colored cotton and also they cause both pollution of textile products and the pollution of drinking water, soil and environment. Therefore the agriculture of natural colored cotton has been increased in America and European countries in recent years because many people in Europe prefer the cloths, which are environment intimate and are made with natural colored cotton[2].

It was informed by Dickerson *et al.*[3] and Kaynak *et al.*[4,5] that brown fibered cotton from colored fibered cotton as half as white fibered cotton, green fibered cotton gave yield as 1/4 as white fibered cotton. However colored fibered cotton was sold with much more price compared with white fibered. Gürel *et al.*[6] informed that the line of camel hair gave less than 30% yield compared with region's standard variety with white fiber Nazilli 84 in their studies doing with the natural fibered cotton in the condition of Menemen, Ödemiş and Nazilli. The yield, fiber quality, endurance of disease and harmful were improved in the studies on the hybridisation and selection doing with brown cotton's eight different color of tones[7]. Natural colored fibered hybrid cotton gave better results compared to its procreators in terms of agronomical and technological[8]. Positive and high level heterosis and heterobeltiosis's proportion were determined in the different tones of brown fibered cotton

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varieties and F_1 and F_2 grades of green and cream colored cotton lines[9]. Natural colored cotton and standard varieties were situated in the same group statistically in terms of seed cotton yield in the mean of two years[10], it was similar with the standard varieties in point of fiber fineness, but it remained behind the standard varieties in terms of fiber length and fiber strength.

MATERIALS AND METHODS

This study was conducted in the University of Dicle (UD) Faculty of Agriculture in experimental field in the years between 2001-2002. The experimental design was Randomized Blocks with four replications.

Brown, light-brown, green fibered cotton lines and Ogosta 644, Beliizvor 432 (white fibered) varieties provided from Nazilli Cotton Research Institute and the region's standard cotton variety Sayar 314 were used for material. The planting was made with these varieties to parcel lengths of 10 m, that is four rows, 70 cm between rows, 20 cm on the rows. Fertilization was applicated in planting 70 kg ha^{-1} pure N and 70 kg ha^{-1} pure P, with the first irrigation 70 kg ha^{-1} pure N too. After the getting out of, the ranges were decreased when the plant had 7-8 leaves. In this experiment, it was hoed by hand ones and by tractor twice and after the first irrigation it was hoed by hand ones and tractor ones. The harvesting was made by hand in two different dates.

In the study, plant height (cm), number of monopodial and sympodial branch (No. $plant^{-1}$), number of bolls (No. $plant^{-1}$), ginning percentage (%) and seed cotton yield (kg ha^{-1}) from agronomical properties; fiber length (mm), fiber fineness (mic) and fiber strength (g tex^{-1}) from fiber technological properties were examined. Fiber technological properties were determined by using the HIV (High Volume Instrument) in the laboratories of the SANKO Holding Textile Joint-Stock Company.

The findings belonging to agronomical and technological properties were evaluated in the MSTAT-C statistics programme and they were grouped according to LSD (0.05).

RESULTS AND DISCUSSION

The natural colored cotton lines' year interaction was found significant in the level of 0.05 related variance analysis results for two years belonging to plant height and the varieties were found significant in the level of 0.01 in the year 2000 and in the results of two years' mean.

It seen in the Table 1 that plant heights are changed between 83.25 and 94.04 cm in 2002 and between 83.18 and 90.44 cm in 2001. It was determined that in the mean of both two years, the variety Ogosta 644 is the longest plant height (90.44 cm), green fibered line (90.28 cm) takes places in the same group and the brown fibered cotton genotype is the shortest genotype of the group (83.21 cm)

Table 1 shows years, varieties and year x variety interaction were found trivial in terms of both number of monopodial and sympodial branch. However, it was determined that brown fibered line and the variety Sayar 314 have the most number of sympodial branch (2.00 No. $plant^{-1}$) and light-brown fibered line has the least number of sympodial branches in the mean of two years.

When being looked at the mean of two years in terms of number of sympodial branches, light-brown (camel hair) cotton genotype has the highest sympodial branches and it is followed by variety Beliizvor 432 (11.39 No. $plant^{-1}$). Green fibered line gave the lowest value with 10.26 No. $plant^{-1}$ sympodial branches

The varieties and years are significant in the level of 0.05 in terms of number of bolls, an important yield element in the natural colored cotton taking place in the study, variety x year interaction, on the other hand, is found trivial (Table 2). One of the region's standard variety Sayar 314 has the highest value in point of number of bolls both of two year mean (respectively, 22.45, 21.55 No. $plant^{-1}$). The variety Beliizvor 432 followed it, respectively, 20.07, 19.23 No. $plant^{-1}$ in the both the mean of two years and also the mean of each two year one by one. The lowest number of bolls was determined in the green fibered line in 2000, 2002 and both two years mean (16.45 No. $plant^{-1}$).

Variety and year interactions were found significant in level of 0.01 according to variance analysis for two years related to ginning percentage values belonging to natural colored cotton that was examined. Three different groups were formed in the both one by one each two year and the compound analysis of years (Table 2).

While looking at the mean of two years, it can be seen that, green (30.76%) and brown (34.34%) fibered cotton line remained behind the light brown (camel hair) (38.60%) and white fibered cotton lines (Sayar 314: 39.45%; Beliizvor 432: 38.94%; Ogosta 644: 38.69%) and green fibered cotton line was taken part after the other varieties in terms of ginning percentage. In percentage a main product is cotton, green fibered line being in a lower level in point of ginning percentage, may cause trouble for successful production.

Varieties were found significant in the level of 0.01 according to the results of variance analysis for two years in terms of natural colored cotton lines' seed cotton yield; years and variety x year interactions were found significant in the level of 0.05 (Table 2). It was not seen

Table 1: The means related to agronomical properties examined in the different colored cotton varieties and lines and their groups

	Plant H (cm)			No. of monopodial branch (No. plant^{-1})			No. of sympodial branch (No. plant^{-1})		
Varieties	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
Light brown fibered line	90.05	83.70	86.88a	1.60	1.33	1.46	11.70	11.58	11.64
Brown fibered line	83.250b	83.18	83.21b	1.85	2.15	2.00	11.28	10.95	11.11
Green fibered line	90.60a	89.95	90.28a	1.65	1.33	1.49	10.28	10.25	10.26
Sayar 314	90.98a	87.68	89.33ab	2.13	1.88	2.00	10.05	12.05	11.05
Ogosta 644	94.00a	86.88	90.44a	1.70	1.70	1.70	9.68	10.30	10.50
Beliizvor 432	92.93a	86.00	89.46b	1.80	2.10	1.95	12.48	11.33	11.39
LSD (%5)	6.63	NS	6.49	NS	NS	NS	NS	NS	NS
C.V (%)	4.87	5.20	5.19	22.99	32.78	27.55	14.25	12.22	10.05
Variety x Year Int.	NS			NS			NS		
Year Int.	Significant at 1%			NS			Significant at 5%		

Table 2: The means related to agronomical properties examined in the different colored cotton varieties and lines and their groups

	Number of bolls (No. plant^{-1})			Ginning percentage			Seed cotton yield (kg ha^{-1})		
Varieties	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
Light brown fibered Line (camel hair)	19.03bc	118.03ab	118.56b	39.20a	38.00a	38.60a	3577.9b	2869.8b	3218.8bc
Brown fibered line	9.13bc	17.08b	18.10bc	5.55b	3.15b	4.34b	2950.9cd	2761.6b	2856.3c
Green fibered line	16.45c	15.55b	16.00c	31.35c	30.15c	30.76c	2541.0d	1919.3c	2230.1d
Sayar 314	22.45a	21.55a	22.00a	39.70a	39.25a	39.45a	4080.6a	3734.3a	3907.5a
Ogosta 644	20.03ab	16.10b	18.06bc	39.50a	37.87a	38.69a	3375.7bc	2817.6b	3096.7bc
Beliizvor 432	20.07ab	19.23ab	19.65ab	39.52a	38.35a	38.94a	3654.1ab	3236.0ab	3445.0b
LSD (%5)	2.79	3.84	2.49	2.79	2.43	1.32	492.7	611.0	395.5
C.V (%)	9.47	14.23	11.65	3.11	4.46	3.73	9.72	14.04	11.42
Variety x Year Int.	NS			NS			Significant at 5%		
Year Int.	Significant at 5%			Significant at 1%			Significant at 5%		

Table 3: The means related to technological properties examined in the different colored cotton varieties and lines and their groups

	Fiber length (mm)			Fiber fineness (mic)			Fiber strength (g tex^{-1})		
Varieties	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
Light brown fibered	24.72c	30.65a	27.69b	4.25a	3.82c	4.04a	30.65ab	27.52b	29.09bc
Brown fibered line	25.20c	25.67c	25.44c	4.27a	4.20bc	4.24a	28.30bc	27.65b	27.97c
Green fibered line	24.02c	25.82bc	24.92c	2.82b	2.92d	2.87b	25.82c	25.12b	25.47c
Sayar 314	28.27b	28.57ab	28.42ab	4.32a	4.82a	4.57a	34.02a	32.80a	33.41a
Ogosta 644	30.57a	28.05abc	29.31ab	4.62a	3.90c	4.26a	31.82ab	32.82a	32.32ab
Beliizvor 432	29.47ab	30.57a	30.02a	4.70a	4.60ab	4.65a	31.35ab	34.12a	32.74ab
LSD (%5)	1.45	20.90	20.09	0.76	0.61	0.64	4.27	3.45	3.82
C.V (%)	3.57	6.81	5.27	12.16	9.98	10.79	9.34	7.63	8.80
Variety x Year Int.	Significant at 1%		Significant at 5%				NS		
Year Int.	Significant at 1%		NS				NS		

another genotype which passed the region's standard variety Sayar 314, respectively 4000.6, 3734.3, 3907.5 kg ha^{-1}) in terms of seed cotton yield in the both two years and these mean of these years (Table 2). The variety Beliizvor 432, took the second place in both two years and mean of these years. When being looked at mean of two years according to seed cotton yield Sayar 314 (3907.5 kg ha^{-1}), Beliizvor 432 (3445.0 kg ha^{-1}), Ogosta 644 (3096.7 kg ha^{-1}) Light brown (camel hair) fibered line (3218.8 kg ha^{-1}) brown fibered line (2856.3 kg ha^{-1}) and green fibered line (2230.1 kg ha^{-1}) were determined, respectively.

Result showed that variety, year and variety x year interaction were found significant in the level of 0.01 in terms of fiber length, which is an important fiber technological property. In 2001, the variety Ogosta 644 (30.57 mm) took the first place the varieties Beliizvor 432 (29.47 mm) and Sayar 314 (28.27 mm) followed it. In 2002 light brown fibered cotton line (30.65 mm) and Beliizvor 432 (30.57 mm) were situated in the same and in the best group, they were followed by Sayar 314 (28.57 mm) and Ogosta 644(28.05 mm). When being looked at mean of two years, Beliizvor 432 (30.02 mm) was determined the longest fibered and brown and green fibered line, respectively 25.44 mm) was the shortest fibered in point of fiber length.

Varieties were found significant in the level of 0.01 according to the results of variance analysis two years related to fiber fineness which is one of the important fiber technological property and variety x year interaction was found significant in the level of 0.05 (Table 3). In the first year, two different groups were formed in point of fiber fineness green fibered line (2.82 mic) was situated in different group from the other cotton lines and it was also determined that green fibered line was the finest fibered

genotype. On the other hand Beliizvor 432 (4.70 mic) was the most thick fibered variety and was followed by Ogosta 644 (4.62 mic) In the second year, it was determined that Sayar 314 (4.82 mic) was the most thick fibered variety and was followed by Beliizvor 432 (4.60 mic). However in the second year light brown (3.82 mic) and green (2.92 mic) fibered lines had the finest fibered lines mean of in two years and light brown fibered line (4.04 mic) and Beliizvor 432 (4.65 mic) followed it respectively. The cotton lines except the green fibered line remained the same group.

When being look at the results of variance analysis for two years related two fiber strength, it was conspicuous that varieties were significant in the level of 0.01 in both two years, but years and variety x year interaction were not significant. When the years were examined separately, the variety Sayar 314 (34.02 g tex^{-1}) was situated in the first groups in terms of fiber strength in the firs year, the variety Ogosta 644 (31.82 g tex^{-1}) and the variety Beliizvor 432 (31.35 g tex^{-1}) followed it. Green fibered line (25.82 g tex^{-1}) was situated in the end. In the second year, two different groups were formed in point of fiber strength and Beliizvor 432 (34.12 g tex^{-1}) Ogosta 644 (32.82 g tex^{-1}), Sayar 314(32.80 g tex^{-1}) were situated in the first and same group, whereas brown fibered lines (27.65 80 g tex^{-1}), light brown fibered and green fibered lines (25. 12 g tex^{-1}) situated in the second group compared with the white fibered cotton varieties. There was any genotype Naturally-colored fibered cotton lines remained behind the white fibered cotton varieties. It was determined that especially green fibered line (25.47 g tex^{-1}) had the worst strength fibers among the other cotton lines and varieties.

Some agronomical and technological properties were researched in the natural colored cotton examined in the study and light brown (camel hair) and brown fibered cotton lines showed close values to the performance of the regions standard variety Sayar 314 in terms of both agronomical and technological properties compared with green fibered cotton line. However green fibered genotype remained behind Sayar 314, with regard to so many agronomical and technological properties (except the properties plant height of plant height and fiber fineness). Varieties and cotton lines were not regarded as significant statistically with regard to number of monopodial and sympodial branch. But at the end of this study continuing two years it was decided that deficient side can be improved with reform studies which will be able to be done in the future.

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