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Performance of Different Cotton Varieties under Agro-Climatic Condition of Awaran District

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***Abstract*:** *The research experimental trial was conducted to determine the growth and yield performance of five varieties of cotton i.e. CIM-620, FH-142, CRIS-129, Krishma and MNH-786, during Rabi season, 2018. Significant differences in plant height, number of sympodial branches per plant, number of bolls per plant, average boll weight, seed cotton yield, ginning out turn, fiber length and fiber fineness were recorded among the varieties. The variety CIM-620 statistically produced maximum yield due to more number of sympodial branches, number of bolls per plant and higher ginning out turn.*
Keywords: Performance, Different cotton varieties, Fiber strength, Lint (%), Seed cotton yield

1. INTRODUCTION

Cotton is the most important fiber crop and second most important oilseed crop in the world (Chary and Leffler, 1984). Cotton is the main stay of Pakistan's economy as it contributes nearly 10% in agriculture GDP and a source of 60% foreign exchange earning. The value added through cotton is 8.6 % in agriculture and 1.8 % in total GDP. At present, cotton is grown on an area of 3075 thousand hectare and production stand as 13000 thousand bales (Anonymous, 2007).

Presently, there is acute need to further exploit the available agricultural and agronomic resources for greater benefits. Owing to increasing population growth rate, the demand for food and cloth has also increased. It indicates the tremendous scope for increasing the yield of seed cotton per hectare by overcoming yield constraints like improper sowing time, use of low yielding varieties, poor quality seed, low seed rate, low plant population, insect pest attack and weed infestation. Among these the varieties which are best suited to ago-climatic conditions and have high yield potential are of great importance. Although many high yielding cotton varieties have been developed and recommended for general cultivation in the past but their performance under farmer's conditions is not upto the mark. The reason being that either these have lost their adaptability to the changing edaphic and environment conditions or these have become susceptible to various pests and diseases.

Efforts, therefore, are needed to raise seed cotton yield through the continuous selection of high yielding cotton cultivars with wide range of adaptability to edaphic and climatic conditions to have site specific varietal selection. The varieties varied significantly for number of bolls per unit area, lint percentage (Wang *et al.*, 2004) seed index oil, protein contents (Rahman *et al.* (1993), ginning outturn (%), staple length (Khan *et al.*, 1989) bollworm resistance (Lisheng, 2005) and seed cotton yield (Ali *et al.*, 2005; Sezener *et al.* 2006; Rahman *et al.* 1993; Anwar *et al.*, 2002 Arshad *et al.*, 2003). One variety may perform better certain climatic condition but may not be a better performaer under different climatic conditions. Therefore the present study was designed to explore the yield potential of some new cotton varieties under the prevailing conditions of Tehsil Jhal Jhao, District Awaran, Balochistan during Rabi Season, 2018 under supervision of Horticulturist Agriculture Research Field Experimental Station (FES) Awaran.

2. MATERIALS AND MATHODS

A field experiment was conducted to determine the growth and yield performance of five new varieties of cotton

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(*Gossypium hirsutum* L.) at farmer field in Tehsil Jhal Jhao, District Awaran Balochistan during Rabi season, 2018 under the office of Horticulturist Agriculture Research Field Experimental Station (FES) Awaran. The experiment was laid out in a randomized complete block design (RCBD) with four replications having a plot size of 15 m x 6 m. The experiment comprised five varieties i.e. CIM-620, FH-142, CRIS-129, Krishma and MNH-786. The crop was sown with single row hand drill using a seed rate of 20 kg ha^{-1} in 75 cm apart rows on during Rabi season, 2018. The plant to plant distance of 15 cm was maintained by thinning at early growth stages. The fertilizer was applied at the rate of 85 kg N and 48 kg P_2O_5 ha^{-1} as urea and diammonium phosphate, respectively. Whole of the phosphorus and one third of nitrogen was applied at sowing while one third of nitrogen with first irrigation and remaining one third with second irrigation. All other agronomic practices were kept normal and uniform for all the treatments. Eight plants were selected at random for recording plant height, number of sympodial branches, number of bolls per plant and average boll weight. Seed cotton yield was recoded on per plot basis and was converted to t ha^{-1}. Ginning out turn was recorded as ratio between weight of the lint and weight of the seed cotton in percentage. Fiber length was measured in millimeters after ginning from each plot and fiber fineness recoded by micronare meter from the lint after ginning. Data collected was analyzed statistically using Fisher's analysis of variance technique at 5 % probability level (Steel *et al*., 1997).

3. RESULTS AND DISCUSSION

Comparison of means for yield and other Yield related traits among varieties

Varieties	Plant height (cm)	Number of sympodial branches (Plant^{-1})	Number of bolls (Plant^{-1})	Average boll weight (g)	Seed cotton yield (t ha-1)	G.O.T (%)	Fibre length (mm)	Fibre fineness (µg inch^{-1})
CIM-620	97.75 ab	21.75 ab	31.60 a	3.48 b	5.57 a	39.42 a	27.95 b	4.31 d
FH-142	91.15 b	19.40 c	21.60 c	3.40 c	3.71 c	39.08 a	28.63 a	4.51 c
CRIS-129	92.45 b	20.15 bc	26.10 b	2.68 d	3.53 c	37.05 b	26.77 c	4.95 a
Krishma	104.8 a	21.58 ab	25.90 b	2.40 e	3.24 c	35.88 c	28.67 a	4.57 bc
MNH-786	104.2 a	22.65 a	24.25 bc	3.88 a	4.79 b	38.92 a	27.13 c	4.70 b
LSD, 0.05%	7.185	1.691	3.358	0.06890	0.4848	0.5359	0.5806	0.1541

Means not sharing a letter with in a column differ statistically at 5% probability level

Different cotton varieties differ significantly for plant height. The maximum plant height (104.8 cm) was observed in case of variety Krishma which was statistically at par with cultivar MNH-786 (104.2 cm) and CIM-620 (97.75 cm). The lowest plant height (91.15 cm) was observed in variety FH-142 and it was statistically at par with variety CRIS-129 (92.45 cm). Differences observed for plant height among cotton varieties can be attributed to variation in genetic make up of crop plants. These results are supported by the findings of Anwar *et al.* (2002) and Copur, (2006) who also reported significant differences among varieties for plant height.

Data regarding to the number of sympodial branches per plant revealed a significant difference among cotton varieties (Table-1). The variety MNH-786 produced the highest number of sympodial branches per plant (22.65). It was statistically at par with variety CIM-620 (21.75) which was statitically at par with Krishma (21.58). The lowest number of sympodial branches per plant was produced by FH-142 (19.40) but it was statistically at par with variety CRIS-129 (20.15). The difference in number of sympodial branches per plant can be attributed to differences in genetic makeup of the cultivars. The significant differences among varieties for number of sympodial branches per plant had also been reported by Copur (2006).

There was significant difference among the varieties in case of number of bolls plant^{-1}. The significantly maximum number of bolls per plant was observed in case of variety CIM-620 (31.60). The varieties CRIS-129 (26.10) and Krishma (25.90) produced statistically same number of bolls per plant. The minimum number of bolls per plant was found in variety FH-142 (21.60). The differences among varieties for number of bolls per plant might have been due to the difference in genetic potential of the cultivars. The significant differences among varieties for number of bolls per plant had also been reported by Anwar *et al.* (2002) and Copur (2006).

Boll weight is directly related to the final seed cotton yield of cotton. A perusal of data indicated that maximum boll weight was recorded in variety MNH-786 (3.88 g) while

the minimum boll weight was recorded in variety Krishma (2.40 g). Significant differences were also found between CIM-620 (3.48 g), FH-142 (3.40 g) and CRIS-129 (2.68 g). The higher boll weight (3.88 g) was in case of MNH-786 followed by CIM-620 (3.48 g), FH-142 (3.40 g) and CRIS-129 (2.68 g). The significant differences among varieties for average boll weight had also been reported by Hofs *et al*. (2006),

All the cotton varieties differed from each other for seed cotton yield. The variety CIM-620 produced significantly maximum seed cotton yield (5.57 t ha^{-1}). The lowest yield was produced by the variety Krishma (3.24 t ha^{-1}), but it was statistically at par with FH-142 (3.71 t ha^{-1}) and CRIS-129 (3.53 t ha^{-1}). The maximum seed cotton yield with CIM-620 can be attributed to maximum number of sympodial branches, number of squares and number of bolls per plant. These results are supported by the findings made by Khan *et al.* (1989), Hofs *et al.* (2006) and Copur (2006).

Ginning out turn (GOT) was significantly influenced by the different varieties. The highest value of ginning out turn was obtained in case of variety CIM-620 (39.42), but it was statistically at par with varieties FH-142 (39.08) and MNH-786 (38.92). There is a positive relationship between yield and ginning out turn percentage. The lowest value of GOT was observed in case of variety Krishma (35.88). These findings are in agreement with those of Khan *et al*. (1989) and Wang *et al*. (2004) who reported that high lint yield was changed by the change of varieties.

The comparison of treatment means indicated that varieties had significant effect on fiber length. The highest staple length was recorded in case of variety Krishma (28.67 mm) and it was statistically at par with variety FH-142 (28.63 mm). The lowest staple length was found in variety CRIS-129 (26.77 mm) but it was statistically at par with variety MNH-786 (27.13 mm). Previous studies reported that fiber length could vary widely with plant variety and growing conditions. Copur (2006) and Khan *et al*. (1989) reported similar results for fiber length in cotton.

Fiber fineness is very important characteristic regarding the fiber quality of cotton and is very useful for textile industry. The comparison of treatment mean indicated that varieties varied significantly for fiber fineness. The maximum thickness of fiber (minimum fineness) was recorded in case of variety CRIS-129 (4.95 µg $inch^{-1}$) and the minimum fiber thickness (maximum fineness) was found in variety CIM-620 (4.31 µg $inch^{-1}$). Differences between the varieties with respect to fiber fineness were also found significant by Copur, (2006).

4. CONCLUSION

On the basis of yield and yield components, the variety CIM-620 performed the best. The use of variety CIM-620 seems to be better to get maximum yield of cotton.

The cotton variety "CIM-620" is recommended for the farmers to cultivate it under climatic condition of Tehsil Jhal Jhao, District Awaran, Balochistan.

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