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INVESTIGATIONS INTO THE PRODUCTIVITY OF THE SECOND FRUITING CYCLE IN COTTON

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The productivity of the second fruiting cycle in cotton was compared with that of the annual seed grown crop under the conditions obtaining at Lyallpur. Ratooning cotton gave significantly higher yield of seed cotton, but the plants showed greater symptoms of magnesium deficiency. However, lint percentage, staple length, fibre strength and fibre fineness were similar in the ratoon and the annual seed grown crops. The former gave a higher net income per acre attributable to its higher yield and reduced cost of cultivation. No serious disease or pest build-up was observed during the course of these investigations.

INTRODUCTION

Cotton occupies an important position in the crop husbandry of Pakistan It is grown on about 4.84 million acres with an estimated production of 3.94 million bales, besides some 5 million people are engaged from farm to factory and processing of cotton (P.C.C.C., 1973). Its share in Gross National Product in the Agricultural sector is 11 per cent and among the major crops more than 22 per cent. It also brings in more than 60 per cent of the total foreign exchange earnings (Abdullah, 1972). Due to the recent loss of income from the jute fibre, the importance of this crop has increased manifolds for this country. Therefore, all efforts should be made to get the maximum yield by following modern cultivation techniques. Whereas there is lot of emphasis on the use of high yielding varieties, fertilization, plant protection measures etc., no systematic investigation has been made to study the effects of the second fruiting cycle in cotton on its yield or cost of production.

Cultivated cotton varieties, although by nature perennial, are generally adapted to annual cultivation with only the initial reproductive cycle contributing to yield. The danger of the build-up of pests and diseases (Rainey and Smith, 1950), fear of obtaining lower yield of seed cotton (Willis, 1931) and belief in the deterioration of quality of lint (Summers, 1924), have not only discouraged attempts at its perennial cultivation on a large scale, but also resulted in banning ratoon cultivation in several cotton growing countries of the world (Evenson, 1970).

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However, the question of ratoon cotton is currently being re-examined in Israel and in the cotton growing areas of the Ord River Valley of Western Australia, where the initial trials have given way to large scale production (Ellern, 1966 and Evenson, 1969). Even in Pakistan, the farmers of Dera Ghazi Khan District have sought permission of the Government to continue ratooning of cotton as they believe that the ratoon crop escapes the attack of black headed cricket and yields better than the annual crop.

In view of the development of modern pest and disease control measures, the danger of the pest build-up in a ratoon crop may have been over-rated. Moreover, there is evidence that ratoon crop yields higher than the annual crop with no harmful effects on the quality of its lint and is economical to cultivate (Peebles and Fulton, 1944; Thomson, 1964; Ellern, 1966 and Evenson, 1969). Hence the present investigation was made to ascertain the production potential of the second fruiting cycle of cotton.

MATERIALS AND METHODS

The commercial variety of American Cotton, A.C. 134, was selected for these investigations. The crop was sown on April 29, 1971, in replicated plots of 1/108 acre at Lyallpur. In the following season, it was kept as ratoon crop and compared with the new annual seed grown crop. The ratoon treatments were kept as unprunned, detopped at 28-inch from the ground surface and cut back to the first internode in January. The competing seed grown crops were seeded in the middles of April and May. All these treatments were arranged in a randomized block design with four replications. Each crop was fertilized at the rate of 100 lb. nitrogen per acre. All other agronomic practices were those recommended for the tract. Standard procedures were adopted to determine plant stand, boll number per plant, average yield per acre, lint percentage, staple length, fibre strength and fibre fineness. Duncan's Multiple Range test was employed to test the statistical significance of the treatment means.

RESULTS AND DISCUSSION

The results in Table 1, show that although comparable plant stands were obtained from the ratoon and the seed grown crops, the yield of seed cotton was significantly higher in the ratoon crop. The higher yield of the ratoon crop was attributable to its earlier and greater fruitset than that of the seed grown crop. These observations confirmed the works of Arndt (1961), Thomson (1964), Ellern (1966) and Evenson (1969).

TABLE 1. *Plant stand, boll number per plant and yield of seed cotton in the ratoon and the seed grown crops*

Treatments	Av. plant stand per unit area (1/108 acre)	Av. Boll No. per plant	Av. yield of seed cotton (lbs. per acre)
Unprunned	201.25 ab*	58.60 ab	2198.52 ab
Detopped at 28 inches	181.50 abc	50.92 b	1968.96 ab
Cut from the first internode	105.75 c	70.57 a	1701.55 b
Reseeded in middle of April	220.00 ab	38.97 c	1253.12 c
Reseeded in middle of May	149.25 bc	15.07 d	352.98 d

* Duncan's Multiple Range Test at 5 per cent probability, any two means within each column not sharing a letter in common differ significantly.

TABLE 2. *Lint percentage, staple length, fibre strength and fibre fineness in the ratoon and seed grown crops*

Treatments	Lint %age	Staple length (inches)	Fibre strength (000 lbs/sq. inch)	Fibre fineness (Micronaire value)
Unprunned	34.40	1.05	94.72	4.43
Detopped at 28 inches	33.05	1.04	93.65	4.40
Cut from the first internode	33.55	1.00	96.47	4.58
Reseeded in middle of April	34.90	1.04	98.50	4.41
Reseeded in middle of May	33.60	1.00	96.97	4.07
	N.S.*	N.S.	N.S.	N.S.

* Nonsignificant at 5 per cent probability.

TABLE 3. *Comparative cost of cultivation and income per acre in ratoon and seed grown crops*

Treatments	*Average yield/acre*		Cost of production/ acre (Rs.)*	Gross income per acre (Rs.)	Net income per acre (Rs.)
	Seed cotton (lbs.)	Sticks (lbs.)			
Unprunned	2198.52	4397.04	509.00	1971.44	1462.44
Detopped at 28 inches	1968.96	3937.92	509.00	1764.82	1255.82
Cut from the first internode	1701.55	3403.10	509.00	1524.32	1015.32
Reseeded in middle of April	1253.12	2506.25	571.50	1121.02	549.52
Reseeded in middle of May	352.98	705.96	571.50	311.46	— 260.04

Rates of seed cotton and cotton sticks were Rs. 72.00 and Re. 1.00 per 82.28 lbs., respectively.

* One Re. = U.S. $ 0.997.

It was interesting to note that the crop cut back to first internode during January experienced severe frost damage resulting in reduced number of the resprouts. However, the plants were more bushy and bore significantly greater number of fruits which considerably made up the loss in yield due to lesser plant population. Hence, it would be highly desirable to investigate the effects of cutting back the plants to the first internode in February or early March when the chances of frost killing of stub cotton would generally be remote.

It may also be observed from Table 1 that within the seed grown crops, earlier planting in April gave higher yield of seed cotton than standard planting in May in this area. The seedlings emerging from the May seeded crop, being more tender and younger, suffered more from the adverse environmental conditions that prevailed during the early seedling and reproduction stages of their growth. The adverse effect was reflected in their thinner seedling establishment, poorer fruiting and consequently lower yield. These observations agreed to an earlier report by Khan (1970), suggesting reconsideration of the traditional practice of seeding cotton in May in this region.

Lint percentage, staple length, fibre strength and fibre fineness were similar in the ratoon and annual seed grown crops (Table 2). These observations contradict the views of Summers (1924), that ratooning may have adverse

effect on the lint quality. These reults find support from the findings of Thomson (1964).

There was no incidence of pests and diseases during the course of these investigations, hence observations of pest build up could not be studied. However, ratoon crop showed greater signs of magnesium starvation which could be overcome by foliar application of this nutrient.

As regards the comparative economics, the ratoon crop, in general, gave higher net income per acre as compared to the annual seed grown crop (Table 3). The increase in income was due partly to the higher yield and partly to the reduced cost of cultivation of the ratoon crop as no reseeding operations were involved in this case. Similar observations were also recorded by Ellern (1966) and Evenson (1970).

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