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# CULTIVATION OF BROACH COTTON IN DHARWAR

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## CULTIVATION OF BROACH COTTON IN DHARWAR.

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*History.*—Among the various indigenous varieties of cotton grown in India Broach is considered to be the best. Its higher percentage of lint combined with the superior class and fine long staple commands in the Bombay market a considerably higher price than other varieties grown in the country.

With the object of introducing this superior cotton, experiments were made at Hubli by a well known cotton merchant, Mr. Rachappa Nili. This gentleman having had no experience of the cultivation of the Broach cotton as practised in Gujarát failed in his attempt and wrongly arrived to the conclusion that Broach cotton was not suitable to the conditions of Dhárwár soil and rainfall. In the meanwhile a Government experimental farm was started at Dhárwár and Mr. Nili on his visit to the farm explained the unsuccessful attempts made by him in introducing Broach cotton at Hubli. These circumstances induced the Agricultural Department to give a special trial to the cultivation of Broach cotton as a purely rain-crop on the newly started farm at Dhárwár and the experiments commenced in the year 1904 on a small scale.

The results obtained in 1904 were very promising and a further trial was made in 1905 on the Government farm on a sufficiently large scale with encouraging results. In the year 1906 a small quantity of seed was distributed to a few enterprising members of the Dhárwár Agricultural Association, who followed the instructions regarding cultivation given by the Agricultural Department and who were also ready to undergo any loss in the cultivation of this new cotton. The experiments were very successful and the promising crops seen in their fields induced a few cultivators to take to this cotton in the year 1907. Accordingly there was some demand in that year for Broach cotton seed. Nearly 2,000 lbs. of pure Broach cotton seed obtained from Navsári was distributed in the year 1907 by the Agricultural Department and the produce obtained by this seed was arranged to be sold by the Department to the best advantage of the growers by organizing a central market at Dhárwár for the purpose.

Several of the leading cotton merchants in Bombay and Ahmedabad and the local merchants at Dhárwár, Hül and Gadag were invited to the auction sale.

The total quantity of cotton collected for auction at the central market amounted to 60 nagas, a naga being equal to 1,344 lbs. The price obtained at the auction sale was Rs. 40 more per naga than for the local Kumpta for the same quantity.

This marked difference in the price of Broach cotton over the local Kumpta has induced many more cultivators near Dhárwár to sow Broach cotton on an extended scale, and during the current year 1908 nearly 18,000 lbs. of seed has been voluntarily taken from the Government farm by cultivators. The standing crop at present seems so good that the cultivation of this new cotton would in the near future be on a very large scale in places where the rainfall and soil conditions are suitable. Besides numerous enquiries are being made by cultivators as to the suitable conditions and proper method of cultivation of Broach cotton. Thus it was found necessary to issue for the information of those interested in the cultivation of Broach cotton in Karnatic, the following instructions regarding the methods adopted on the Government farm for the successful cultivation of Broach cotton.

*Soil and Rainfall.*—Medium or pure black soil to a depth of three feet and above with a rainfall of 25 to 30 inches well distributed between July and November are the suitable conditions for the successful growth of Broach cotton in Dhárwár or in Karnatic. There are many suitable tracts in Karnatic where this superior cotton can be substituted for the already growing indigenous Kumpta cotton or the acclimatized Dhárwár-American cotton. During the last three years Broach cotton is grown very successfully near Dhárwár both on the Government farm and on cultivators' fields.

*Tillage before sowing and manure.*—Like all cottons Broach also requires deep ploughing before sowing. A deep ploughing by an English Turnwrest or a country plough in the cold weather immediately after the pervious crop of jowár is harvested, would be very favourable for the succeeding crop of Broach cotton. If both an English and a country plough are available with a cultivator the former is preferable as it goes deeper and leaves no interspace unploughed. A light and uniform dressing of farm yard manure of about 5 cart-loads per acre every second year in which cotton is grown would be a sufficient moderate application of manure which would cost about Rs. 4 or 5 at the most. Very heavy application of manure sometimes becomes injurious to the

crops especially when the rainfall is short or untimely. The proper time for the application of manure is after the anti-monsoon showers, *i. e.*, about the end of May. If the manure is applied before the rains the finer portion of the manure is blown away by the wind. The land should be harrowed once or twice after the manure is applied which makes a thorough soft seed bed for Broach cotton.

*Time of sowing.*—Broach cotton has a longer period of growth and consequently requires to be sown about 2 months earlier than the local cottons, *viz.*, Kumpta and Dhárwár-American. The most proper and suitable time for sowing Broach cotton is the end of June or beginning of July. If sown at this time the first picking will commence late in February and the last about the middle of April when there is no risk of anti-monsoon rains. Later sowing than the middle of July is always risky and should be avoided.

*Distance between rows and plants.*—Plants of Broach cotton grow taller and branch more freely than the local Kumpta. It is very important therefore that these plants should be kept as thin as possible. A distance of 24 inches between two rows is found to be fairly sufficient for the branching habit of this cotton plant. The distance between plants in the row should be at least 12". It is rather difficult to sow cotton seed by the existing country seed-drill regularly at 12" apart in the row. It is therefore advised to sow the seed in the ordinary way by a seed-drill of 24" apart with a seed rate of 8 lbs. to an acre. With this seed rate plants after germination will be very thick, *i. e.*, about 2" apart. These should be thinned at regular distance of 12" apart. In thinning the plants very great care should be taken to remove the weaker seedlings and keep the stronger ones.

*Thinning of plants.*—The operation of thinning out cotton and jawár plants is very common in Gujarát. In Karnatic the practice is unknown, but the operation of thinning out plants is very important in the successful cultivation of Broach cotton and there is no sin, as is considered by certain cultivators, in removing plants that are not required. The most appropriate time to thin the plants is when they attain the height of 6" to 8". This will be within 40 or 45 days after sowing. It is no good to thin the plants later than this date.

*Pruning of plants.*—The second important operation to obtain a heavy crop of Broach cotton is to top the plants when they are about a foot high. Pruning at this stage induces the plants to branch freely. Otherwise plants grow very tall and become more woody and consequently yield less cotton.

*Expenses for thinning and pruning.*—The operations of thinning and pruning being quite new to cultivators of Karnatic seem at first sight to be very expensive. But by actual work by hired labour it is found that the cost of both the operations comes to about only a rupee per acre. While the increase in the produce due to these operations is worth at least Rs. 5 per acre.

*Interculturing.*—Repeated intercultures after each rainfall from the time of thinning until the plants begin to flower is most beneficial. But care should be taken not to enter when the soil is wet. Interculturing when the soil is wet is injurious rather than beneficial. The last interculture should be as deep as possible. For this purpose heavy intercultures of the Gujarát pattern are most convenient. Patterns of these intercultures can be seen on the Dhárwár Government farm. If the intercultures do not enter the ground sufficiently deep, a light plough may be used with advantage.

*Mixtures of subordinate crops in cotton.*—It is a common practice in the Karnatic to grow cotton with a mixture of various other subordinate crops such as kulthi, cucumbers, rabi jowári, linseed, niger seed, castors and various others. This practice is not as advantageous to the cultivators as is now considered to be. It is true that the subordinate crop gives some outturn. But the luxurious growth of some of the crops like kulthi and cucumbers entangle the young cotton plants to such an extent in their early stage that they remain weak and pale even after the subordinate crops are removed. In the same way the taller plants like castors or rabi jowar overshadow the cotton plants which consequently lose their vigour of growth.

*Diseases.*—The important disease to which Broach cotton is liable for, is the attack of mite. By this disease the cotton leaves assume a dirty ashy colour and begin to curl. The disease is known as "Budi Rog" in Kánarese. It has been found by experiments on the Government farm at Dhárwár that the disease can be prevented to a great extent by steeping the seed for 10 minutes in 2 per cent. copper sulphate solution before sowing. The seed can be steeped either just or weeks before the sowing time. In the former case the seed does not require drying. In the latter case it should be thoroughly dried in shade and then stored. Certain cultivators suspect the germinating power of steeped seed. It has been found by experimental trials, that seed steeped in 2 per cent. solution for 10 minutes and thoroughly dried under shade does not lose its vitality to the slightest extent.

Every one of the seeds treated in this way germinates most satisfactorily.

The other disease is the "Wilt" to cotton plants. The common name in Kánarese for "Wilt" is "Shidi". By this disease, plants wither altogether. The disease begins just near the surface of the cotton main root. The disease can easily be seen by the naked eye. If a recently attacked plant is pulled up and the root cut by a penknife, a tinge of black is seen instead of clean white colour which is the sign of a healthy plant. The disease is very contagious and spreads very rapidly. The only successful remedy to prevent wilt, is to remove the attacked plants as soon as the disease breaks out. If the diseased plants are not removed in time, the disease spreads to a great extent and causes considerable damage to the crop.

*Insects.*—The most injurious insects to the Broach as well as other cottons are the "cotton-stemborers", the "boll worms" and the "red cotton bugs". The stemborers can be prevented by removing and burning the attacked plants. The caterpillars in their early stage live in the stems of attacked plants and if such plants are pulled and burnt at the proper time, the pest disappears at once. If this is not done in time, the caterpillars soon change into moths and increase in numbers. The pest then becomes irremediable. The cotton boll worm can be checked by a catch crop of Bhendi in the cotton crop. It has been found by experiments that boll worms are more readily attracted by Bhendi fruits rather than cotton bolls. If a light sprinkling of Bhendi seed is mixed in cotton seed while sowing, the Bhendi plants germinate here and there and check the boll worm to a considerable extent. The variety of Bhendi should be a late one so that it will flower at the same time as with cotton. Greatest care should be taken to remove the attacked fruits of Bhendi and burn them so that the caterpillars would die altogether. If the attacked fruits of the Bhendi are not removed the pest will increase and there will be no effect of the mixture of Bhendi against the boll worm. The pest of red cotton bug is the easiest of all for destruction. The insects when young can easily be collected in a pot and then destroyed. The insects generally appear round a cotton boll. These can easily be collected by a slight shaking of the attacked boll in a pot containing water and a slight quantity of kerosine oil. The insects when fall in this water die soon and the damage can thus be reduced.

*Outturn of Broach cotton.*—A good crop of Broach cotton systematically and carefully cultivated in the way above indicated,

would yield from 600 to 900 lbs. seed cotton per acre. To be on the safe side I would take here the average yield of Broach cotton to be 2 nagas per kurgi of 4 acres, a naga being equal to 1,344 lbs. There may be fields which would yield less than above. But the yield taken above is the average from good and bad fields.

*Picking of cotton.*—The peculiar characteristic of Broach cotton is that it is free from leaf, etc., dust. If a little special care is taken Broach cotton can be picked from the plants thoroughly free from leaves or Bractioles. Morning is the best time for picking cotton. The usual time for picking cotton in Karnatic is in the afternoon when there is strong wind which carries broken cotton leaves, etc., to the heaps of cotton which are made in fields here and there by the picking women. It is very important to observe cleanliness in picking cotton. Dirty cotton reduces the price to a considerable extent.

*Superiority of Broach cotton over the Kumpta.*—Broach cotton is superior to the local Kumpta in many respects.

- (1) Its average yield per acre is more than Kumpta. If the two cottons are grown on good land under similar treatments, Broach would give at least 100 lbs. more per acre than the Kumpta cotton.
- (2) The percentage of lint in Broach cotton is higher than the Kumpta. Broach has 33 per cent. of lint while Kumpta has only 25 per cent.
- (3) Broach cotton has the peculiar characteristic of being free from leaf or Bractiole dust which is very important in spinning. It has also a glossy white colour and consequently commands a higher price than all other Indian cottons. In staple it is the same as Kumpta.

*Profits in growing Broach cotton over the local Kumpta.*—It has been already stated that the yield of Broach cotton on good land is more than the local Kumpta, if both are grown under similar treatments. Supposing that the yield of both the varieties becomes equal, still there is a clear profit of about Rs. 10 or more per acre when the Broach is substituted for the Kumpta. In arriving at Rs. 10 as clear extra profit, the yield of both the varieties is taken to be 500 lbs. per acre which is least for the Broach cotton. The high percentage of lint alone in the Broach cotton commands an extra amount of Rs. 30 more per naga than the Kumpta cotton. If quality is considered, the extra price to be realized for Broach cotton ought to be more than Rs. 30 per naga.



The following figures compare the cost of cultivation and value of yield of the Broach and Kumpta cotton both when grown on good lands with liberal treatments.

The figures are given for a field of 10 acres :—

Broach cotton.	Cost of cultivation.	Kumpta cotton.
Rs. a. p.		Rs. a. p.
25 0 0	Cost of ploughing land in the hot weather by an English T. W. plough for one cotton crop and by a country plough for the 2nd cotton crop (in a period of 4 years in rotation with jowár). Total cost of the two ploughings being Rs. 100. Proportionate for one year.	25 0 0
25 0 0	Cost of manure farm yard, 5 cart-loads per acre every alternate year, at Re. 1 per cart-load including carting charges to fields. Proportionate charges for one year.	25 0 0
10 0 0	Cost of spreading manure ...	10 0 0
5 0 0	Cost of 2 harrowings before sowing cotton.	5 0 0
2 8 0	Price of seed at 32 lbs. per rupee, 80 lbs. Broach and Kumpta 60 lbs.	1 14 0
5 0 0	Thinning of plants ...	...
15 0 0	Handweeding three times Broach and twice Kumpta.	10 0 0
5 0 0	Pruning of plants ...	...
20 0 0	Interculturing six times Broach, Kumpta four times.	16 0 0
50 0 0	Picking cotton ...	40 0 0
<b>Total ... 162 8 0</b>		<b>Total ... 132 14 0</b>

*Receipts.*

Broach cotton.	Yield of cotton.	Kumpta cotton
Rs. a. p.		Rs. a. p.
	600 lbs. Broach cotton and 550 lbs. Kumpta cotton per acre ; for 10 acres—	
	6,000 lbs. Broach, Kumpta 5,500 lbs., at an average rate of Rs. 125 per naga of Broach and Rs. 100 per naga of Kumpta ... ..	
558 0 0		409 0 0

The yield of 50 lbs. more per acre of Broach cotton than the Kumpta is the least quantity. It will surely range from 50 to 100 lbs. and the difference in rate of Rs. 25 per naga is also least. Last year (1908) the difference in the price obtained in the central market was Rs. 40 per naga and this year too (1909) the difference was about the same on the average. The best sample of Broach cotton which yielded above 35 per cent. of lint, was sold at the public auction at Rs. 174 per naga, while the rate for the local Kumpta cotton was, on that day Rs. 116 at Hubli (the chief market place for cotton in Karnatak). Thus taking the least amount of extra yield and rate by the cultivation of Broach cotton over the Kumpta, the net profit comes to Rs. 10 to Rs. 12 more per acre.

The figures given are by actual experience on Government farm and on observation on cultivators' fields.