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IMPROVEMENT IN COTTON PRODUCTION.

WORK IN THE NORTHERN DIVISION.

I took charge of the cotton work at the end of 1903 when there were several indigenous varieties grown at Poona, Manjri and Surat for classification and hybridization. That time the work was to see to the purification of the varieties, and new crosses were being made every year according to the scheme sent by the Inspector General up to 1904 and afterwards as prepared by Mr. Fletcher till his departure and then as approved by Mr. Main.

From the year 1905 foreign cottons were being collected by Mr. Fletcher from all the parts of the world. They were nearly 300 in number and 300 were the indigenous ones. All these were grown at Surat. The work of taking full description of all these cottons was going on for two years and the papers were given over to that officer as he wanted to publish them in a book form with nearly 100 photos taken in the field while notes on crosses were kept by me. The crosses that were made in 1902 and 1903 were shifted to Surat from Poona and Manjri when the head-quarters of the Deputy Director were made Surat, but afterwards the Herbaccum crosses were continued at Surat while the crosses of Neglectum and Indicum with Herbaccum were shifted to Jalgaon plot and then to the Dhulia farm when it was started.

These crosses were being renewed or rejected under his personal inspection. Several such crosses were made at Nadiad also of exotic cottons, but the crosses of exotic varieties deteriorated in future generations though selected every year while the crosses of Dhulia became short in fibre and coarse in feel in that tract of scanty rainfall as they were with late ripening varieties.

In Gujarat at Surat, the Herbaccum crosses were being continuously selected and there were nearly 36 remaining when Mr. Fletcher went and these also were further selected and only the 3 best were grown on a larger scale for distribution. They were:—

1018 $\frac{P.}{G.}$...Broach × Broach.
1027-A. L. F.	...Kumpta × Ghoghari.
1340 L. F.	...Kumpta × Kumpta.

Out of these the first was distributed in the Surat District from the year 1908 and the 2nd from year 1909 and results are already reported by the Divisional Inspector while 1340, the Kumpta cross, was transferred to Dharwar. Beside these three crosses, selected Broach that was selected for better length and feel has proved better in yield and ginning per centage than these crosses and this was distributed on a much larger scale than these crosses in the district from the year 1909, and this will continue its improvement of quality, yield and ginning under the present selection. Its highest yield was 1,100 lbs. last year with 34 to 35.5% of ginning compared with 800 lbs. and 33 ginning of the 3 crosses and 650 lbs. of local cotton with the ginning

of 3.2%. On an average an increase of 100 lbs. of seed cotton with 2.3% higher ginning will give Rs. 15 to 20 more per acre and cultivators round about accept 100 lbs. as more yield of these cottons over the local crop.

Unit Selection.

The work of unit selection of the very best plants of the best crosses and varieties and growing them individually either for getting higher ginning or better quality of fibre is yet continued according to Mr. Main's views as this work was started by him after his coming both at Nadiad and Surat.

Mendel's Experiments.

Mendel's experiments which were started in 1904 in Mr. Fletcher's time were continued under Mr. Main and definite results were obtained regarding the dominancy of colour and its response to Mendel's Law and the figures are already printed in the annual reports of the Surat farm. According to this law, regarding the various characters of a cotton plant, the cross comilla with Bani at Dhulia is giving good results as the fibre is valued equal to Broach and may solve the question of better fibre for Khandesh and it is as early as Khandesh cotton or even earlier in opening and per plant these observations are to be still continued there and all the 40 strains will be grown on a larger scale next year.

N. R. Cotton.

In Khandesh the separation of N. R. Cotton from the mixed local variety was started from the year 1905 for its higher ginning and greater number of bolls and the yields noted afterwards from 1909 when the seed was sufficient for the field trials, prove that it is the most hardy, best yielding and best ginning variety for Khandesh, Deccan and Punch Mahals and more trials of improving the ginning per cent. are continued on the Dhulia farm.

The highest yield obtained in 1910 was 1,500 lbs. per acre with 37% while this year also it gives the yield of 1,396 lbs. on the Dhulia farm compared with 1,000 lbs. of the best crop of local cotton in any year with 33 ginning per cent. The work was started in Mr. Fletcher's time, but field trials and distribution in the district were done afterwards and will give more than Rs. 5 per acre for higher ginning and a crore of rupees in one million acres of cotton in Khandesh even by an increase of 100 lbs. of seed cotton per acre in good and inferior soils if average be taken and when the variety will be fully established in the district and the seed from all the seed farms be supplied pure by purification and supervision.

Tree Cottons.

These experiments which were conducted on the Surat, Dohad and Nadiad farms for 3-4 years, gave good yields for 2 years on the Nadiad farm, but on the whole they failed everywhere showing that tree cottons will not equal the annual cottons.

Trials of Varieties.

The trials of varieties on the Nadiad farm have shown that Lalio cotton will suit the district where only Rozy was grown and its distribution is going on every year and people themselves are extending the area while Cambodia suits only to limited localities with means of irrigation and its area will remain very limited as, as a dry crop, it is not likely to succeed over Lalio. Both these varieties are being selected for higher ginning on the Nadiad farm.

Lalio under irrigation also is a good variety for the district, while in Ahmedabad it is grown successfully both as dry and irrigated on the Dholka line. But after all Kaira is not a cotton district, but of tobacco and cotton cultivation will be limited so long as tobacco pays well.

Conclusion.

On the whole, the districts, Surat, Panch Mahals, Kaira and Khandesh, in which the farms were situated have got now one or more varieties improved, nor it is desirable to have many as they become mixed in general cultivation while for Broach and Ahmedabad, their existing varieties cannot be changed as these places are noted for ginning, though selection I-A and Lalio respectively which are being selected for higher ginning, may prove useful after some years for distribution.

The Imperial Cotton Specialist holds the same views regarding selected Broach (selection I-A and selection II) and for N. R. Cotton which are selected for higher ginning and yield as mentioned in paras. 3 and 4 of his report No. 429 of 1st July 1913 while for dry crop Cambodia he is doubtful as mentioned in para. 7 of the same report forwarded to me with Deputy Director of Agriculture's No. 4135 of 22nd October 1913.

Trials of Commercial Varieties.

The trials were started from the year 1905 from Mr. Fletcher's time and are yet continued to watch the deterioration or improvement in the seed of each taluka in Khandesh and Gujarat. This was also helpful to determine where the pure seed should be distributed first of any pure or improved variety and helped Mr. Fletcher to write the leaflet on Bombay cottons.

Typical Varieties.

The work of growing the principal varieties of the Bombay Presidency year after year to watch the changes in the ginning per cent. due to locality was conducted from the time of Mr. Fletcher and the result obtained is :—

The ginning per cent. of a variety either goes down or up as to reach the ginning of the local cotton where the trials are taken.

Survey Work.

Gujarat, Kathiawar and East Khandesh were surveyed and the observations printed in the College Quarterly through our office and what chances of improvement are possible are mentioned further.

SURAT DISTRICT.

As for the results of my cotton survey of Gujarat I may say that the Surat district has got pure Broach Deshi which realizes its price according to the locality and the name of the gin and not so much for quality, and higher ginning of this cotton will help the cultivators more without the help of middlemen and work upon this principle is already going on, on the Surat farm for the last 5 years, the improved Broach cotton ginning as much as 35.5 compared with 32 of the local cotton.

As regards yield also it will be seen that this cotton (selection II) has yielded the highest, *i.e.*, 1,100 lbs., for the last year and this year also it will stand first.

Quality Experiments.

Of course the quality experiments were conducted for the last 10 years on the Surat farm according to the desire of Manchester merchants and the Inspector General of Agriculture and the results achieved were encouraging as will be seen from the valuations of these cottons printed in the report of the Surat farm for several years, but the failure of the seed distribution was due to outside causes as printed in the Director's report of 1912-13.

These samples were also valued in England in 1910-11 and those results also were equally good as will be seen from Mr. Arnold Smith's remarks regarding them received in our office:—

The wording was "to whomever I have shown the samples was delighted to see what cotton could be produced in India." So the failure was not due to any defect in quality or selection but to the fluctuations in the market, to middlemen and to local merchants and the failure of Greaves Cotton & Co. to pay the higher prices for the quality for which the Bombay merchants are not so much appreciative.

BROACH DISTRICT.

No experiments were specially made for the Broach district as the Surat cottons were also intended for Broach if quality would have been well paid.

As for higher ginning which is always higher in Broach than in Surat when we can produce a variety giving a higher ginning than 35, then only its introduction will be successful and selection I-A giving the ginning of 35 is being tried on a small scale in southern Broach as in Hansot where Broach is grown almost pure and gins 32-33.

Still Ghoghori that gins up to 38 is a rival in the northern division of the district where there is the greater proportion of Ghoghori and the merchants pay the same rate there to the cultivators for each variety.

Of course in black soils Ghoghori is believed to yield less per acre compared with Broach, though it gins better, still the introduction of selection I-A in Broach will depend upon the results of yield of some years of the Broach plot of Broach and Ghoghori.

KAIRA.

As for Kaira, Cambodia was found to grow well under irrigation and its distribution was made in the district, but it is not keeping up its ginning per cent. which was reported to be 37 while in the district or on the farm it gives only 31 to 32.

But Lalio if grown under irrigation gins 33 to 35 and the better quality of Cambodia cannot be compensated by its lower ginning, nor it is better in yield than Lalio; its distribution will be limited to irrigated areas and this was already pointed out by Mr. Main in his report of 1911-12 while the results of this year from the district are not more encouraging as a dry crop.

There was very little cultivation of cotton in Kaira except Rozi, and Lalio is spreading in the district slowly and the farm is supplying good seed to some persons every year and this variety will spread in the district by and by while Broach Deshi that has got lower ginning will not suit the tract nor will it yield equal to Lalio either as a dry or an irrigated crop.

AHMEDABAD.

No special trials were made for Ahmedabad and the introduction of Navsari local as a trial by the Deputy Director through the Nadiad farm or of Cambodia through the Divisional Inspector of Agriculture has showed that the higher ginning alone pays there while these two varieties giving the ginning of 31-32 of better quality are not paid proportionately to make up for the loss in ginning.

As for yield, Navsari is not equal to Lalio, but Cambodia sometimes yields better under irrigation in this district also as in Kaira.

PANCH MAHALS.

N. R. Cotton that is grown on the Dohad farm is giving the yield up to 1,200 lbs. per acre equal to Rs. 150 and the further spread of this cotton in that district will bring out very good results, as the Gujarat cottons do not survive the frost while this variety ripens much earlier. Cambodia along the Canal side grows all right, but not every year and it will not compete with N. R.

KATHIAWAD.

As for Kathiawad, the States of Wadhawan and Wankaner already grow Lalio and Kanvi while the remaining Kathiawad States grow Methio, a mixture of all the types of Khandesh cotton and pure seed of N. R. is the only best variety for the light tract.

SURAT FARM.

1904.

1. 60 crosses without sub-division of Herbaceum. 96 crosses Herbaceum with Indicum and Hirsutum crosses.
2. Mendel's experiments.
3. Indigenous Cottons.
In this selected Broach was found out
4. New crosses of Herbaceum.

Remarks.

1. The crosses of Bombay Herbaceum were continued here. Those with Indicum were sent to Dhulia and Hirsutum to Dharwar.
2. 4 new crosses between red and yellow flowers were made.
3. Being grown to note the ginning, to continue purity and to make new crosses.
4. From the past results, new crosses of Herbaceum were made.

1905.

1. 128 crosses with their sub-divisions.
2. Analyses of commercial varieties.
3. Mendel's experiments.
4. Indigenous cottons and cottons of the world.
5. Prepotency crosses.

Remarks.

1. The best 60 being kept, the rest were rejected. Complete list sent with my report of 1905-06. They were sub-divided this year as good, ordinary and bad.
2. Varieties from Chamber of Commerce and Khandesh talukas, analysed. This work was newly started.
3. Continued, selected Broach grown separately.
4. Collection of cottons of the world and observations continued.
5. Newly made.

1906.

1. 60 crosses.
2. Analyses of commercial varieties.
3. Mendel's experiments.
4. Indigenous cottons of the world.
5. New crosses of tree cottons, Mendel's crosses and Watt's Hybrids, prepotency crosses finished.

Remarks.

1. Taking remarks of crosses, 24, rejected.
2. Continued.
3. Do. selected Broach grown sepeately.
4. Continued and observations made.
5. Started newly for observations.

1907.

1. 36 crosses with sub-divisions.
2. Trial of Cambodia.
3. Analyses of commercial varieties.
4. Mendel's experiments.
5. Tree cotton trials.
6. Indigenous varieties.
7. Herbaccum crosses and exotic crosses.
8. Selected Broach.

Remarks.

1. 14 crosses only continued, the rest being inferior to them.
2. Field trials continued.
3. Continued.
4. Continued and some new crosses added for observations.
5. Newly started for field trials.
6. Observations completed.
7. New crosses being made as usual.
8. Grown on a field scale and sub-divided.

1908.

1. 14 crosses with sub-divisions and selected Broach.
2. Trials of Cambodia and Buri.
3. Analyses of commercial varieties.
4. New crosses of Cambodia *inter se* and Cambodia with tree cottons started.
5. Mendel's experiments.
6. Tree cotton trials.
7. Quantity selection of selection I and 1340.

Remarks.

1. 1340 L. C rejected, the rest continued.
2. Trials of Cambodia and Buri going on. Buri trial started this year.
3. Continued.
4. Started newly.
5. Going on.
6. Continued.
7. Newly started.

1909.

1. 1030 %, 1018 P/G, 1018 V/G, 1339 L F, 1338 L C, 1343, 1058 V/G, 1058 O/G, 1027 ALF, I and II, 1027 V/G, 1027 AL C, 1340, 1038 O/G Selected Broach.
2. Trials of Cambodia and Buri.
3. Analyses of commercial varieties.
4. Unit selection of special select plants started.
5. Cambodia *inter se* and Cambodia with tree cottons.
6. Mendel's experiments.
7. Tree cotton trials.

Remarks.

1. 1030 % rejected for inferior quality, the rest continued.
2. The yields were not so good.
3. Continued
4. Do.
5. Do. and new crosses of Cambodia and Buri with tree cottons were made.
6. Continued.
7. Out of 7 varieties of tree cottons only 2 gave fair yields.

1910.

1. Selection of selected Broach for quality and quantity.
2. Selection of 1018 V/G and P/G, 1339 L F, 1338 L C, 1343, 1058 V/G, 1058 O/G, 1030 S/G, 1027 A L F, I and II, 1027 V/G, 1027 A L C, 1340 L F.
3. Trials of Cambodia and Buri.
4. Analyses of commercial varieties.
5. Unit selection of special select plants.
6. Cambodia × Herbaccnm, Cambodia *enter se*, Cambodia and Buri with tree cottons
7. Mendel's experiments.
Trials of tree cottons.

Remarks.

1. Selection continued for quantity from this year.
2. Do. and 1018 V/G, 1339 L F, 1338 L C, 1343, 1058 V/G, 1058 O/G, 1030 O/G, were rejected.
3. Trials of Cambodia and Buri continued.
4. To be continued.
5. Do.
6. Comilla Herbaccum were newly made, Cambodia *inter se* were selected while Cambodia and Buri with tree cottons were kept for further observations as they were not good.
7. Observations continued and definite results obtained. A few plants kept for further observations.
8. Rejected being inferior to local in yield.

1911.

1. Selection of selected Broach for quality and quantity.
2. Selection of 1027 A L F, I and II, 1027 V/G, 1027 A L C, 1340 L F and 1340 L F A.
3. Trials of Cambodia and Buri and Ghogori and Broach.
4. Analyses of commerical varieties.
5. Unit selection of special select plants.
6. Comilla × Herbaccum were crossed and Cambodia *inter se* and Cambodia with tree cottons and tree cottons with Buri were grown.
7. Mendel's experiments.

Remarks.

1. Selection continued.
2. Do.
3. Trials continued and Cambodia and Buri yielded better than all the cottons.
4. To be continued.
5. Do.
6. Cambodia *inter se* and tree cottons with Cambodia continued while tree cottons with Buri were rejected.
7. Some observations were made and then left off for further observations.

1912.

1. Selection of selected Broach for quality and quantity.
2. Selection of 1027 A L F, I and II, 1027 V/G, 1027 A L C, 1340 L F and 1340 L F A.
3. Trials of Cambodia, Buri and Ghogori and Broach.
4. Analyses of commerical varieties.

1912—contd.

5. Unit selection of special select plants.
6. Trials of various varieties of cotton on different gins.
7. Comilla × Herbaccum crosses were continued and also tree cottons with Cambodia and Buri.

Remarks.

1. Selection to be continued.
2. 1027 A L F, I, 1027 V/G, 1027 A L C, and 1340 L F A, were inferior to their sub-division.
3. Continued one year more.
4. To be continued. The samples to be collected by the Department instead of through the Mamlatdars.
5. To be continued.
6. Results printed in the annual report, 1912-13, pp. 47-48.
7. The fibre being inferior, they were rejected, but a few Comilla × Herbaccum were kept for observation.

1913.

1. Selection of selected Broach for quality and quantity.
2. Selection of 1018 P/G and 1027 A L F, II, for quality and 1340 L F for Dharwar.
3. Trials of Cambodia and Buri and Ghoghori and Broach for comparison with crosses.
4. Analyses of commercial varieties of Khandesh and Gujarat.
5. Unit selection of special select plants of selected Broach and the above crosses.
6. Comilla × Herbaccum crosses.

Remarks.

1. This selection will give good results and will suit for the Surat district.
2. This selection is being continued according to Director's instructions on a small scale though Mr. Main expressed on 15-6-13 to continue the selected Broach only.
3. Cambodia and Buri are to be discontinued for the black soils (*vide* Mr. Main's report of 1912-13, page 10).
4. Khandesh varieties to be grown in Khandesh as remarked by the Director in future.
5. Unit selection of special plants to be continued as definite results are to be reached yet.
6. Rectified.

NADIAD FARM.

1905-1906.

1. Trials of tree cottons.
2. Making new crosses

Remarks.

1. Trials of several tree cottons were continued.
2. New crosses between tree cottons with Sea Island, Abassi and Americans were made this year.

1906-07.

1. Trials of Lalio and Wagad, two indigenous varieties.
2. Trials of Lalio with irrigation and without irrigation.
3. Trial of Dharwar-American.
4. Trial of tree cottons.
5. Selection of the crosses of tree cottons with Americans, Abassi and Sea Island.
6. Making new crosses with tree cottons and rough Peruvians.

Remarks.

1. Lalio gave superior yield.
2. Lalio irrigated gave much higher yield than unirrigated one.
3. Dharwar-American was a failure.
4. Nurma promising more success than the other 2 tree cotton varieties.
5. Selection of the crosses continued and kept up for further trials. Tree cotton crosses with Sea Island and Abassi are good while those with Americans were not good.
6. New crosses of tree cottons with rough Peruvians were made for further trials.

1907.

1. Trials of 2 indigenous varieties Wagad and Lalio.
2. The trial of the crosses of tree cottons with (Americans, Abassi and Sea Island with rough Peruvians.

Remarks.

1. Lalio yielded better than Wagad.
2. Selection continued.

1908.

1. Tree cottons with Abassi, Americans and Sea Island.
2. Tree cottons.

Remarks.

1. Amongst the crosses, 5 best ones of tree cottons with Abassi and Americans were continued while those with Sea Island were rejected.
2. Tree cottons 23 T and 10 T were found to yield much better than the others.

1909-10.

1. Crosses of tree cottons with Americans and with Abassi.
2. Special select plants on the principle of unit selection.
3. Tree cottons.
4. Abassi \times Americans.

Remarks.

1. Five crosses of tree cottons with Americans and Abassi were given a field trial by sowing in May. Out of which 3 were selected and kept up for further trials as they had pretty good yield.
2. Out of the Hybrids 1367 and 1368, special plants were selected for unit selection.
3. 2nd year crop gave good yields.
4. New crosses of Abassi with Americans were made for further trials.

1910.

1. Trials of Cambodia and Buri.
2. Tree cottons with Americans.
3. Special select plants.
4. Tree cottons.
5. Abassi with Cambodia and Americans and tree cottons.
6. Americans with Abassi.

Remarks.

1. May sown—Buri yielded better than Cambodia.
July unirrigated— Ditto. ditto.
2. May sown yields nearer to Cambodia. July sown irrigated rejected being low in yield. The cross 1379 was rejected being poor in yield and late in maturity.
3. Selected for fibre only.
4. 2nd year crop gave the highest yield on the farm.
5. New crosses made for trial.
6. 1st generation and hence the fibre was very good.

1911.

1. Trials of Cambodia and Buri and 3 Indigenous :—
Lalio, Ghoggori, selected Broach and crosses of tree cottons with Americans.
2. Cambodia, Buri and American with Abassi and Abassi with tree cottons, 1st generation.
3. Comilla × Lalio.
4. Special select plants.
5. Tree cottons.
6. N. R. cotton.

Remarks.

1. May sown Lalio best. Buri 2nd in yield.
July sown, 1st irrigated Lalio, 2nd Buri and last Cambodia.
Tree cottons with American, May sown, gave poor yields.
2. 1st generation of these was good and specially Cambodia with Abassi.
3. Tree cottons with Americans were a new trial and also Comilla × Lalio.
4. Selected plants have good fibre but low ginning.
5. 3rd year crop gave best yields when local crop failed.
6. N.-R. yielded nearer to tree cottons.

1912.

1. Trials of Cambodia, Buri and 3 Indigenous and crosses of tree cottons with American field trials.
2. Cambodia and Buri crosses with Abassi and tree cottons (old and new).
3. Comilla × Lalio crosses.
4. Special select plants.
5. Tree cottons.
6. N. R. cotton.

Remarks.

1. Crosses of tree cottons with American degenerated and rejected.
Cambodia yielded more than Lalio in May sown while in July sown and irrigated Ghoggori and fine Broach yielded the best while Buri gave higher than Cambodia and Lalio. Lalio gave the lowest yield.
Lalio July unirrigated gave the best yield.
2. Abassi crosses degenerated in the 2nd generation in fibre and ginning so only Cambodia and Buri crosses with Abassi made for further trials.
Tree cotton crosses were inferior from the 1st generation.
3. Not improving but kept for observations.
4. Plants with good fibre being selected but low in per cent.
5. Yields poor. One plot only kept for observation.
6. July, unirrigated, gave the highest yield compared with other varieties, but was discontinued as inferior in fibre and thus unsuited for Gujarat to avoid admixture with fine varieties.

1913.

1. Trials of Cambodia, Buri and 3 indigenous cottons, irrigated and un-irrigated.
2. Cambodia and Buri crosses with Abassi.
3. Comilla \times Latio crosses.
4. Special select plants of Abassi crosses.
5. Tree cottons.

Remarks.

1. Cambodia, Buri and Latio sown in May and irrigated Latio gave the highest yield while Cambodia approaches.
Cambodia, Buri, Latio, Ghoghoi, Broach, July sown and irrigated :—
Regarding Latio and Cambodia yield remarks similar to May sown ones.
The same varieties unirrigated. On accounts of white-ants the results are not comparable.
2. Exotic crosses deteriorate in the 2nd generation.
3. Fibre becomes inferior like Comilla.
4. Half a dozen plants with good ginning and fibre kept, the rest rejected.
5. They have failed everywhere.

DOHAD FARM.

1908-09.

1. Trials of Nadiad tree cottons and their crosses.
2. Trials of annual varieties of Gujarat.

Remarks.

Due to frost all died away.

1909-10.

1. Trial of Khandesh cotton and Bourbon tree cottons.
2. Best soil for Bourbon.
3. Best spacing for Bourbon.
4. Experiments with Hybrids of Nadiad Farm.

Remarks.

1. Khandesh cotton gave a high yield of 1070 lbs., also Bourbon cotton of the 2nd year crop gave 1020 lbs.
2. Bourbon does not thrive on poor soils.
3. Best spacing 6' \times 6'.
4. Trials of Nadiad Hybrids of Nadiad farm continued.

1910-11.

1. Trials of Karkeli types and N. R. cotton.
2. Trials of Bourbon.
3. Trials of crosses of Nadiad.

Remarks.

1. Karkeli and N. R. gave almost equally good yields.
2. Bourbon, a third year crop, did not yield well and was affected by frost and hence May sowing was to be tried, but as no irrigation facilities then existed the scheme was abandoned.
3. Experiments on the Hybrids of Nadiad farm continued.

1911-12.

Famine. Nadiad crosses were lost this year.

1912-13.

1. Trials of N. R. Khandesh, Buri and Cambodia.

Remarks.

1. Buri gave the highest yield and Khandesh the lowest yield. Next stands N. R. and then comes Cambodia, but N. R. is much earlier and higher in ginning and is thus suited for the light tract and frost.

1913-14.

1. N. R. cotton.
2. Cambodia and Buri.

Remarks.

1. N. R. has given good yields this year also and thus on the whole is the best suited for the tract.
2. Cambodia and Buri were affected with leaf roller and thus it seems that they are more liable to diseases and to climatic changes.

WORK IN THE SOUTHERN DIVISION.

Cotton Work prior to the Agricultural Department.

Improvement of the cotton crop was first undertaken in this part by the East India Company about the year 1830. Mr. Shaw, the Collector of Dharwar, experimented with New Orleans cotton in the year 1841-42 near Hubli and as a result of this experiment, the variety was subsequently introduced in the Eastern talukas of the Dharwar district. Beyond this successful acclimatization of the American Cotton we have no important results from the work done by the East India Company.

AGRICULTURAL DEPARTMENT.

Experimental Farms.

An experimental station was started at Dharwar with improvement of the cotton crop as one of the main objects. Work in this connection was therefore undertaken soon after the opening of the station in 1904. In 1908-1909, two more important stations were started at Gadag and at Gokak respectively. Gadag being situated in the tract well suited to the American cottons was from the beginning intended for the trial of Hirsutum. Gokak commands canal irrigation and although cotton cannot receive much attention on this farm a few varieties and crosses are tried under irrigation.

Dharwar Farm.

Dharwar is the central station in the S. M. Country. Most of the cottons tried were first grown on this station and then sent to Gadag or Gokak for further trial. The cross fertilization work has up-till-now been done entirely on this farm.

Gadag Farm.

Some of the Hirsutum varieties and crosses under trial at Dharwar in 1908-09 were grown for the first time as duplicates on the Gadag Farm. But the Gadag cottons always grew better than those at Dharwar which suffered more or less from red leaf blight and were on this account weak and unhealthy. This naturally led to the final transfer of all the Hirsutum strains from Dharwar, which was done in the year 1912 in response to the advice of the Imperial Cotton Specialist.

Gokak Farm.

Cotton experiments were commenced at Gokak in the year 1910. Egyptian cottons and a few crosses with Abassi as one of the parents are under trial on this farm. All these are grown under irrigation. A trial of Broach and Camboria is also conducted here.

The improvement of the cotton crop in the S. M. Country is mainly the outcome of the work done on these three farms by the Cotton Supervisor under the direct control of the Deputy Director of Agriculture, S.D., and to the work of the Divisional Inspector of Agriculture in the Districts. The latter officer distributes the seed of the successful cottons and thus popularises them in tracts suitable to them.

The work of the Cotton Supervisor can be conveniently described under the three farms as below :—

(1) DHARWAR FARM.

Methods of Improvement.

Improvement of cotton was attempted by following methods :—

1. Selection of the indigenous variety 'Kumpta.'

2. Hybridization of the exotics including the Indian cottons with the indigenous.

3. Fertilisation.

Quality Selection in Kumpta.

Quality selection in Kumpta was started in 1904 for improving the quality of the staple. In 1905, three kinds of fibre selections were made. Kumpta 04 q I for fine fibre, q II for long fibre and q III for long and fine fibre. These were continued till 1907 when the first two divisions were rejected and only the third for long and fine staple continued. Since then, this has been grown and selected carefully every year. The following statement shows the improvement achieved in the direction sought :

[See Statement on page 18.]

Statement giving the remarks on the staple of Kumpta selected for quality.

Name.	Year.	Remarks by Messrs. Tata & Sons.	Remarks by Chamber of Commerce.
Kumpta 0½ q III (selected for quality).	1907	Superior to Kumpta better than Kumpta procurable in the market.	Not valued.
	1908	Shows improvement all throughout	... Class staple and style superior to Kumpta.
	1909	Equal to Kumpta	... Nice silky and strong staple.
	1910	Superior in staple to Kumpta	... Better in staple than Kumpta.
	1911	Shows improvement in colour	... Much better class and very much better staple than Kumpta.
	1912	Better than Kumpta	... Staple good.

From these remarks it will be seen that the staple has appreciably improved by selection.

Quantity Selection in Kumpta.

In 1909, another kind of selection was undertaken to improve the ginning outturn of Kumpta. The following statement summarises the results obtained in this direction :—

[See *Statement on page 20.*]

Statement showing the ginning outturns of Kumpta selected for quantity and Kumpta unselected grown side by side.

Serial No.	Name.	GINNING OUTTURN IN					REMARKS.
		1909.	1910.	1911.	1912.	1913.	
1	Kumpta 04 q III A (selected for quantity.)	26·2	26·7	25·0	27·2	27·3	Grown side by side with No. 2.
2	Kumpta (ordinary) ...	25·2	23·6	22·1	24·1	23·3	

The ginning percentage of this strain has reached even in some cases as high a figure as 29. In all cases, there is decided increase over ordinary (unselected) Kumpta grown under the same conditions. It is also interesting to note here that there is an appreciable advantage in point of yield and that the selected seed has often produced a more vigorous and a better yielding crop.

ACCLIMATIZATION.

Trial of Cotton Varieties on Dharwar Farm.

A large number of varieties foreign and Indian have been tried on this farm with the object of introducing a better variety in the tract. The following list gives the names of the cottons thus tried.

List of Cotton Varieties grown on the Dharwar Farm for trial since 1904.

Serial No.	Register No.	Name.	Year of introduction.	Duration of the trial.	REMARKS.
1		Broach ...	1904	Still grown.	Indian.
2		Ghoghari ...	1905	"	"
3		Wagad ...	1906	6 years.	"
4		Mathio ...	"	6 "	"
5		Nadam ...	"	6 "	"
6		Jari ...	"	6 "	"
7		Varadi ...	"	6 "	"
8		Bani ...	"	7 "	"
9		Comilla ...	"	7 "	"
10	16 E	Christopher ...	1904	5 years.	American.
11	17 E	King ...	"	5 "	"
12	18 E	Excelsior ...	"	5 "	"
13	19 E	Sea Brook ...	"	3 "	"
14	20 E	Culpepper ...	"	5 "	"

Serial No.	Register No.	Name.	Year of introduction.	Duration of the trial.	REMARKS.
15	26 E	Sea Island ...	1904	4 years.	American.
16	38 E	New Orlean ...	"	6 "	"
17	53 E	Cambodia Philliphine.	1906	7 "	Cambodias.
18	63 E	Do. Indo-China.	"	7 "	"
19	67 E	Do. do. ...	"	7 "	"
20	68 E	Do. do. ..	"	7 "	"
21	102 E	Do Madras ...	1907	6 "	"
22		Do. Siagon ...	1910	3 "	"
23		Do. Jalarpet ...	"	3 "	"
24		Fruit ...	1904	5 "	Americ
25		Texas Bur ..	"	5 "	"
26		Kemper county ...	"	5 "	"
27	211 E	Allens Hybrid ...	1906	4 "	"
28	212 E	Boyds Prolific ...	"	4 "	"
29	213 E	Tatas Allens Hybrid...	1907	2 "	"
30	214	Texas long staple ...	"	2 "	"
31		Abassi ...	1905	3 "	Egyptian.
32		Mitaffi ...	1907	1 year.	"
33		Bamia ...	"	1 "	"
34		Yanowitch ...	"	1 "	"
35		Buri ...	1908	3 years.	Bengal.

Besides these, 192 exotic varieties 116 T (tree cotton varieties) and 14 × (wild) varieties were grown on a small scale in the year 1907 and some of these were continued till 1909. The names and origin of these cottons being unknown, they are not mentioned here.

In 1909, 93 samples of cotton from different talukas in the S. M. Country were also grown for analysis.

Success with Broach Cotton.

Broach cotton was tried on this farm in the year 1904. The cotton gave very promising results even in the first year of introduction. Its trial was therefore continued in 1905 when it gave better results than Kumta, notwithstanding the unfavourable nature of the season. These two trials being successful, the seed of this cotton was recommended to certain well-to-do rajats who willingly undertook to cultivate it in their fields as a further trial. Here also, the cotton gave equally good results and thus gained the popularity of the cultivators who have since that year been growing it on an extended scale in such parts of the tract as are favoured by early rainfall.

The accompanying statement gives the acreage of Broach cotton grown in this part and an idea of the extra money which its cultivation is bringing to the growers.

[See Statement on page 24.]

Statement showing the area cropped with Broach Cotton in the S. M. Country and the extra money secured by its cultivation.

Serial No.	Year.	Area under Broach in acres.	Quantity of Kapas in Nagas of 1844.	Price of the Kapas obtained in the auction sale.			Price of the same quantity of local cotton on the day of the sale.			Difference giving the extra amount obtained by the growers.			REMARKS.
				Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
	1910	2616	654	1,11,455	0	0	94,830	0	0	16,625	0	0	This calculation is based on the assumption that Broach and Kumpta yield the same quantity, whereas the yield of Broach is usually heavier.
	1911	684	171	37,069	0	0	26,163	0	0	10,906	0	0	
	1912	1720	430	81,545	0	0	72,680	0	0	5,865	0	0	
	1913	2380	595	1,09,393	0	0	82,110	0	0	27,283	0	0	

The acclimatization of other varieties in the list is more or less a failure. A few of these, however, *viz*, New Orleans, Allens Hybrid, Texas long staple, Allens long staple are still under trial at Gadag.

Cambodias.

Cambodia cotton was received from three sources:—(1) Philliphine islands 53 E (2), Indo-China 66 E, 67 E and 68 E, (3) Madras 102 E.

Cottons from these places were all tried at Dharwar till 1908 when they were sent to Gadag. They were promising at Dharwar but they fairly established their superiority over the local D.A. cotton of Gadag after continued trial for a few years. All these different Cambodias were cultivated separately on both the farms till 1912 when they were abandoned at Dharwar and only 102 E (Madras Cambodia) kept at Gadag.

Hybridization.

Cross fertilisation was once much relied upon, in bringing about the desired improvements in the cotton crop. Accordingly numerous crosses were made in all possible directions. These were grown year after year and carefully selected with definite objects in view. But notwithstanding the persistent rigid selection, most of them disappointed us altogether. The following list gives a fair idea of the trial made with various Hybrids on the Dharwar Farm.

[See List on page 26.]

*List of Hybrid Cottons grown on the Dharwar
Farm for trial.*

Serial No.	Registered No.	Name.	Year of production.	Duration of trial.
1	1245	Dharwar-American × Christopher	1903 at Manjri.	5 years. Tried for the first time in 1904.
2	1246	Khaki Lyallpur × Abassi white...	"	3 years.
3	1247	Do. × Abassi Khaki.	"	3 "
4	1248	Mitaffi × Khaki Lyallpur ...	"	1 "
5	1249	Dharwar-Americans × Kumpta.	"	5 "
6	1250	Do. × Varadi ...	"	5 "
7	1252	Do. × Dharwar-American fine.	"	5 "
8	1253	Do. × do Prolific.	"	4 "
9	1254	Do. × Ghogori fine.	"	3 "
10	1255	Do. × do. Prolific.	"	3 "
11	1256	Do. × Kumpta fine...	"	3 "
12	1257	Do. × do. Prolific.	"	5 "
13	1261	Do. × Ghogori ...	"	1 "
14	1345	Christopher <i>inter se</i> ...	1904	4 "
15	1346	King do. ...	(Dharwar). "	3 "
16		Excelsior do. ...	"	2 "
17		Sea Brook do. ...	"	2 "
18	1348	Culpepper do. ...	"	4 "
19		Sea Island do ...	"	2 "
20	1350	D. A. white × New Orleans ...	1905.	3 "
21	1351	New Orleans × D. A. green ...	"	3 "

Serial No.	Registered No.	Name.	Year of production.	Duration of trial.
22	1352	D. A. green × New Orleans ...	1905	2 years.
23	1354	D. A. white × D. A. green ...	"	3 "
24	1355	D. A. white × Culpepper ...	"	3 "
25	1356	Culpepper × Chrestopher ...	"	4 " still grown at Gadag.
26	1357	Chrestopher × Culpepper ...	"	3 years.
27	1358	Chrestopher × Abassi ...	"	2 "
28	1359	King × Abassi ...	"	4 "
29	1361	Culpepper × Abassi ...	"	4 "
30	1362	Kumpta × Kumpta ...	"	Still grown.
31	1363	Ghoghori × Kumpta ...	"	"
32	1364	Kumpta × Ghoghori ...	"	"
33		Do. × D. A. white ...	"	1 year.
34		Broach × New Orleans ...	"	1 "
35		New Orleans × New Orleans ...	"	1 "
36		Do. × D. A. white ...	"	1 "
37		Culpepper × Kumpta ...	"	1 "
38		Do. × D. A. ...	"	1 "
39		Ghoghori × New Orleans ...	"	1 "
40		D. A. white × D. A. white ...	"	1 "
41	1392	Sea Island × Bourbon ...	1906	3 years.
42	1393	Bourbon × Sea Island ...	"	3 "
43	1394	Abassi × Bourbon ...	"	3 "
44	1395	Do. × Culpepper ...	"	3 "
45	1396	Do. × 53 E (Cambodia) ...	"	3 "

Serial No.	Registered No.	Name.	Year of production.	Duration of trial.
46	1397	Abassi × 65 E (Cambodia) ...	1906	3 years .
47	1398	Do. × 67 E do. ...	"	3 "
48		D. A. green × 101 T ...	"	1 year .
49		Abassi × King ...	"	1 "
50		Do. × D. A. Green ...	"	3 years.
51		Bourbon × Abassi ...	"	1 year.
52		Do. × Rough Peruvian ...	"	1 "
53	2001	Kumpta × Broach ...	1907	4 years.
54	2002	Broach × Kumpta ...	"	4 "
55	2003	Kumta × Ghoghoi ...	"	Still grown
56	2004	Ghoghoi × Kumta ...	"	"
57	2005	Broach × Ghoghoi ...	"	4 years.
58	2006	Ghoghoi × Broach ...	"	4 "
59		D. A. green × Cambodia ...	"	2 "
60		Cambodia × D. A. Green ...	"	2 "
61		Bourbon × Bamia ...	"	2 "
62		Bamia × Bourbon ...	"	2 "
63		58 E × Kumpta ...	"	2 "
64		117E × Abassi ...	"	1 year.
65	2007	Kumpta 01 q III <i>inter se</i> ...	1908	Still grown.
66		New Orleans do. ...	"	1 year.
67	2008	53 E Cambodia do. ...	"	4 years.
68	2009	66 E Do. do. ...	"	4 "
69	2010	67 E Do. do. ...	"	4 "
70	2011	68 E Do. do. ...	"	4 "

Serial No.	Registered No.	Name.	Year of production.	Duration of trial.
71		Trait <i>inter se</i> ...	1908	1 year.
72		Allens Hybrid <i>inter se</i> ...	"	1 "
73		Tatas Allens Hybrid do. ...	"	1 "
74	2012	Kumpta 04 q III do. ...	1909	Still grown.
75	2013	Navasari × Navasari ...	"	"
76	2014	Broach old <i>inter se</i> ...	"	"
77	2015	Kumpta do. ...	"	"
78	2016	Do. 04 q III × Comilla ...	"	"
79	2017	Comilla × Kumpta 04 q III ...	"	"
80	2018	Buri × Buri ...	"	1 year.
81	2019	Do. × Comilla ...	"	3 years.
82	2020	Comilla × Bani ...	"	3 "

Serial No.	Registered No.	Name.	Year of production.	Duration of trial.	Remarks.
83		Ghoghori × Bani ...	1910	2 years.	
84		Bani × Ghoghori ...	"	2 "	
85		Kumpta × Comilla ...	"	2 "	
86		Comilla × Kumpta ...	"	2 "	
87		Cambodia × <i>inter se</i> 102E	"	2 "	
88		102E × Soft Peruvian .	"	Still grown	
89		Soft Peruvian × 102E .	"	"	
90	1027A	Kumpta × Ghoghori ...	1901	Still grown	Tried for the first time 1907.
91	1339	Do. × cross <i>inter se</i>	"	"	" 1908
92	1340	Do. do.	"	"	" 1908
93	1367	Texas × Bourbon ...	1st trial in 1907	Duration, 1 year.	Nadiad crosses made in 1906.
94	1368	Do. × 15 T ...	"	"	"
95	1369	Do. × 20 T ...	"	"	"
96	1370	Do. × 23 T ...	"	"	"
97	1372	Do. × 29 T ...	"	"	"
98	1373	Do. × 47 T ...	"	"	"
99	1374	Do. × 48 T ...	"	"	"
100	1375	Do. × Soft Peruvian	"	"	"
101	1376	Do. × 22 T ...	"	"	"
102	1377	Abissi × 3 T ...	"	"	"
103	1378	Do. × 18 T ...	"	"	"

Serial No.	Registered No.	Name.	Year of production.	Duration of trial.	Remarks.
104	1379	Abassi × 20 T ...	1st trial in 1907	Duration, 1 year.	Crosses made at Nadiad in 1906.
105	1380	Do. × 21 T ...	"	1 "	"
106	1382	Do. × 47 T ...	"	1 "	"
107	1383	Sea Island × 3 T ...	"	1 "	"
108	1384	Do. × 13 T ...	"	1 "	"
109	1385	Do. × 15 T ...	"	1 "	"
110	1386	Do. × 18 T ...	"	1 "	"
111	1387	Do. × 20 T ...	"	1 "	"
112	1388	Do. × 21 T ...	"	1 "	"
113	1389	Do. × 35 T ...	"	1 "	"
114	1390	Do. × 39 T ...	"	1 "	"
115	1391	Do. × Soft Peruvian.	"	1 "	"
116	1365	Natural cross in Sea Brook.	1907	2 years.	Found in 1906 at Dharwar.
117	1366	Do. Sea Island.	"	2 "	"

Ghoghori and Kumpta Crosses.

Of these Hybrids, only a few are still being grown while the remainder have been rejected. Ghoghori is found to be a good strain for crossing with Kumpta. Five* crosses between Ghoghori and Kumpta are cultivated on the Dharwar farm and they all seem to be promising. The colour of the lint and staple of these crosses is always appreciated by Messrs. Tata and Sons and by the Bombay Chamber of Commerce who kindly value them every year.

GINNING PERCENTAGE.

Yield.

The ginning percentage although varying slightly is higher than that of Kumpta, while the yield is fairly good and comparable with that of Kumpta. These crosses were late in ripening in the first few generations, but they now mature with Kumpta even when both are sown at the same time.

Inter se Crosses of Kumpta.

There are six† *inter se* crosses of Kumpta under trial on the Dharwar Farm. Of these the old crosses made at Kirkee, *viz.*, 1339 and 1340, are quite different from the remaining four. These resemble Broach more than Kumpta in many respects and can be well compared to Broach grown from acclimatised seed. The seed of 1339 (Kirkee Kumpta cross) is distributed to cultivators by the Department. The *inter se* crosses of Kumpta made at Dharwar, four in number, are not in any way superior to Kumpta. A good deal of time and labour bestowed on cross fertilisation and selection is thus ill repaid; but it is certainly not wasted. The method of work is remodelled in the light of our past experience and more attention is now paid to few very promising things.

Fall in the Ginning Percentage of other Indian Cottons.

An experiment was undertaken to investigate the variation in the ginning percentage of some of the Indian cottons when grown under the climatic conditions of Dharwar. This was started in the year 1906 and after the experience of 6 years, it was found that the cottons which have a higher ginning percentage than Kumpta, *i.e.*, 30 and above, show a decided fall after some years. The fall is not regular being obscured owing to fluctuations due to the climatic conditions. The varieties whose ginning percentage is approximately the same as Kumpta retain their percentage with some variation.

Deterioration of Broach Cotton.

Broach cotton deteriorates in colour and ginning percentage when grown year after year at Dharwar. The results show that the fall in the ginning percentage is appreciable after the 3rd or 4th generation. This throws much light on the subject of importing Broach seed from Gujarat which must be renewed at least once in 3 or 4 years; otherwise, the introduced cotton may lose its Broach character.

* (1) 1027A.	(2) 1363.	(3) 1364.	(4) 2003.	(5) 2004.
† (1) 1339.	(2) 1340.	(3) 1362.	(4) 2001.	(5) 2012. (6) 2015.

ANALYTICAL WORK.

Mixtures in Cotton.

93 samples of cottons cultivated in the different talukas of the S. M. Country were grown on the Dharwar farm with the object of finding out roughly the extent of mixtures in different places. From the results obtained, it was possible to draw the following conclusion. Kumpta and Dharwar-American seeds are found more or less mixed together in almost every field. Dharwar-American crop is however more mixed than Kumpta while Kumpta may be found quite pure in some places. The cottons of the Sholapur district seem to be much mixed as all the samples coming from that district contained varying but large proportions of D. A. Kumpta and Neglectum seeds. This shows that much can be done to improve the cotton crop by arrangements to give pure seeds to cultivators and work to achieve this is already progressing well.

MENDELIAN INVESTIGATION.

Red and Yellow Colour of the Petals.

A few crosses were made on this farm to study the recessive and dominant nature of some of the mendelian characters in cotton. A cross between red flowered Arboreun and yellow flowered Kumpta proved that red colour is dominant over yellow. The recessives and dominants bred true, while the impure dominants went on splitting in the proportion of 1 R, 2 RY, and 1 Y, thus showing simple segregation.

Yellow and White Colour of the Petals.

The cross between yellow flowered and white flowered cottons showed that yellow was dominant over white in the same way as red over yellow.

The splitting of a cross between white and red would be more interesting in this connection and will be studied later on.

This cross is receiving further attention.

(2) GADAG FARM.

Separation of the Types in D. A.

Improvement of the acclimatised Dharwar-American cotton which is grown largely in the tract round about Gadag was undertaken here by selection and separation of the different types. The deterioration of this cotton seems to be caused by the presence of different types which are found mixed in the field. It is almost established that a crop from green seed yields better and gives a higher percentage of lint than a crop from white seed. Other types are also separated and grown pure for finding out their merits. When

this is done, the best type alone will be encouraged and the remaining eliminated. The following types are at present under trial :—

- (1) D. A. green seeded.
- (2) D. A. white seeded.
- (3) D. A. yellow flowered.
- (4) D. A. white flowered.
- (5) D. A. New Orleans type.
- (6) D. A. Upland type.

Selection in Dharwar-American is undertaken to improve its staple. Plants with long and fine staple are selected on the unit system. No appreciable results have however been obtained up-till now.

Trial of Varieties.

The following cotton varieties were grown on this farm. Most of them had already been tried at Dharwar from which place they were sent here for further trial.

List of Cotton Varieties tried on the Gadag Farm.

Serial No.	Registered No.	Name.	Year of Introduction.	Duration of trial.	Remarks.
1	16 E	Christopher ...	1908	4 years.	Received from Dharwar.
2	17 E	King ...	"	3 "	"
3	18 E	Excelsior ...	"	3 "	"
4	20 E	Culpepper ...	"	3 "	"
5	38 E	New Orleans ...	"	Still grown	"
6	53 E	Cambodia Phillipine Islands.	"	5 years.	"
7	66 E	Do. Indo China ...	"	5 "	"
8	67 E	Do. " ...	"	5 "	"
9	68 E	Do. " ...	"	5 "	"
10	102 E	Do. Trichanopally.	"	Still grown	"
11		Do. Siagon ...	1910	3 years.	Siagon direct.
12		Do. Jalarpet ...	"	3 "	

Madras Cambodia gins very high. The ginning percentage was 42 in 1909-10, but this is not kept up. It has, however, maintained 38% throughout its trial. The yield has also been better than that of Dharwar-American green seed except in one year 1912-13 which was abnormally unfavourable to the variety throughout the district, but quite favourable to Dharwar-American.

The seed of this Madras Cambodia is now fairly largely distributed in Gadag and Ron talukas of the district. There is also much scope for this cotton in the Bijapur district especially in the Hungund taluka. This cotton does very well in light soils under irrigation as in Madras. The results obtained at Gokak from trial of this cotton under irrigation are encouraging.

Hybridisation.

A few crosses that were promising on the Dharwar farm were also tried here. No crossing was done on this farm except in the year 1909-1910.

The following statement gives the names of the crosses that were grown since 1908 :—

[See statement on page 40.]

List of Hybrid Cottons tried on the Gadag Farm.

Serial No.	Regd. No.	Name.	Year of the 1st trial.	Duration of trial.	Remarks.
1	1245	D. A. × Christopher ...	1908	5 years.	Manjri crosses made in 1903. Seed received from Dharwar Farm.
2	1249	D. A. × Kumpta ...	"	1 year.	
3	1252	D. A. × D. A. Fine ...	"	1 "	
4	1257	Kumpta × D. A. ...	"	1 "	
5	1345	Christopher <i>inter se</i> ...	"	5 years.	Dharwar cross of 1904. "
6	1350	D.A.White × New Orleans.	1909	1 year.	
7	1351	New Orleans × D. A. green.	"	1 "	"
8	1356	Culpepper × Christopher.	1908	still grown	"
9	1357	Christopher × Culpepper.	"	2 years	"
10	1361	Abassi × Culpepper ...	"	2 "	"
11		D. A. Green × Allens Long Staple.	1910	1 year.	Gadag crosses of 1909.
12		Allens Long Staple × D. A. green.	"	1 "	
13		D.A. Green × Cambodia.	"	1 "	"
14		Cambodia × D. A. green.	"	1 "	"
15		Upland Georgian <i>inter se</i> .	"	1 "	"
16		Allens Long Staple do.	"	1 "	"
17		Boyd's Prolific do.	"	1 "	"
18		Cambodia (66-E) do.	"	1 "	"
19		New Orleans do.	"	1 "	"
20		Buri do.	"	1 "	"
21		Cambodia 102E do.	1912	still grown	Dharwar cross of 1910.
22		Cambodia × Soft Peruvian.	1913	1 year.	
23		Soft Peruvian × Cambodia.	"	1 "	"

Gokak Farm.

Cotton work on this farm is confined to the trial of a few crosses and varieties under irrigation. Brooch and Cambodia cotton are being grown under irrigation. The results although promising are not yet conclusive. The following Hybrids were transferred to this farm from Dharwar in the year 1910.

[See list of Hybrids on page 42.]

List of Hybrids tried on the Gokak Canal Farm.

Serial No.	Regd. No.	Name.	Year of the 1st trial.	Duration of trial.	Remarks.
1	1359	Abassi × King ...	1910.	1 year.	Dharwar cross of 1905.
2	1361	Abassi × Culpepper ...	"	1 "	"
3	1367	Texas × Bourbon ...	"	1 "	Nadiad cross of 1906.
4	1380	Abassi × Bourbon ...	"	1 "	"
5	1392	Sea Island × Bourbon...	"	3 years.	Dharwar cross of 1906.
6	1393	Bourbon × Sea Island...	"	2 "	"
7	1394	Abassi × Bourbon ...	"	1 year.	"
8	1395	Abassi × Culpepper ...	"	2 years.	"
9	1396	Abassi × Cambodia 53-E.	"	stillgrown	"
10	1397	Abassi × Cambodia 66E.	"	2 years.	"

A few Egyptian cottons were also grown here but without any definite result.

Tree Cottons.

A number of tree cotton varieties were under trial at Dharwar on a small scale. A few of these, especially the Bourbon and Peruvian were also grown on a sufficiently large scale to test their relative advantages. But in no case was their cultivation found to be in any way profitable.

Bourbon is also grown at Gokak receiving irrigation during hot weather. The yield obtained in the 2nd and 3rd year of its growth is satisfactory, but the evils to which its cultivation is exposed, such as the overcrowding of weeds, insect attacks and the trouble of filling the gaps very often, do not make it a success.

Publications.

A Bulletin on the Broach cotton in the S. M. Country and a leaflet on the cultivation of Cambodia cotton are published on the basis of the experience gained by the work of the department.

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