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Frequently Asked Questions About Biotech Cotton II

(ICAC Recorder)

(Continued from Issue No.12 dt.18.06.2013...)

Where Does Yield Improvement, if Any, Come From in Biotech Cotton?

The genetic ability of the plant to produce higher yields does not improve with biotech cotton, and yet, the literature provides abundant references to higher yields achieved with biotech cotton varieties compared to non-biotech varieties. Cotton is vulnerable to a number of insect pests, and huge losses may occur if the plant is not sprayed with protective chemicals. The losses due to pests are directly proportional to the pest pressure in the field. Insecticide applications minimize losses due to insect pests but do not completely eliminate them. Currently, most countries follow the pest threshold method, and insecticide applications are recommended when the specific pressure threshold or level for a particular pest has been reached. Each threshold is a level or stage at which the benefits of using an insecticide are greater than the cost of the insecticide and its application. But at this stage, the plant, or its fruiting forms, have already suffered at least some damage, particularly in the case of a bollworm attack. Biotech cotton has no threshold for the target pest. The toxin is present in the plant even if there is not a single bollworm larva in the field. Thus, the use of insect-resistant biotech cotton eliminates or minimizes the pre-threshold losses that occur prior to the initiation of insecticide applications.

The situation in the case of herbicide-tolerant biotech cotton is similar, but slightly different. Pre-emergence use of herbicides kills weeds at a very early stage, thus avoiding any competition with the cotton plant for nutrients and water. When growers employ manual or mechanical removal of weeds, they start weeding operations only when they actually see the weeds in the fields. Herbicides must not be sprayed on non-biotech herbicide-susceptible cotton and tractors cannot be taken into the fields for weeding. Neither is it feasible to remove grown weeds manually or with small implements. Consequently, when post-emergence herbicides are used, herbicide-tolerant biotech cotton (e.g. Roundup Ready Flex) has a clear advantage over non-biotech herbicide-susceptible cotton.

What Other Effects do Biotech Genes Have on Yield-Related Performance?

In the case of insect-resistant biotech cotton, the increase in yield, if any, depends on the reduction of losses due to insect damage even after the application of the usual pest control measures. The maximum increase in yield becomes apparent when a biotech variety is compared with a conventional variety grown under unsprayed conditions. When conventional fields are sprayed in a timely and effective manner against target pests, a biotech variety may produce only a minimal increase in yield, or none at all. In a non-biotech crop, the increase in yield is a direct indication of how precisely insect control practices have been followed. Insect-resistant biotech cotton usually produces early boll setting, thus changing the whole plant phenology. Yield may remain the same as in the non-biotech variety, but the location of bolls on the plant is different in biotech cotton. More bolls are formed closer to the main stem. Biotech varieties may also mature earlier than the isogenic non-biotech varieties.

Does a Biotech Variety Require Different Agronomic Treatments?

Early boll retention and more numerous bolls can change the plant's needs and drive it to reach its 'cutout' stage earlier, thus resulting in early crop maturity. Early fruit load, coupled with a heavier fruit load, might limit access to the supply of nutrients needed for normal growth, thus leading to smaller plants and lower yields, which, in turn can compromise the usefulness of a biotech event. To overcome this potential problem, when adopting biotech varieties, growers must introduce changes into their conventional agronomic practices. The critical factors that will ultimately determine farmers' decisions are: cropping systems and varietal suitability to early or delayed planting. If cotton is grown in a one-year rotation with fallow lands and there is no urgency to vacate fields by a certain date, it makes no difference whether the crop is planted early or late. But when cotton follows a different crop and there is not enough time between the harvest of the previous crop and the planting of cotton, a 2-3 week delay might provide the extra time needed to prepare the land properly for optimal germination of cotton. Similarly, the interval between the cotton harvest and planting of the following crop might affect the yield of the latter. Certain varieties may not be suitable for late planting at 2-3 weeks, so they must be planted at the right time, irrespective of whether they are biotech or conventional. Lastly, delayed planting may not affect yield, but late planting of a biotech variety can affect fiber quality. This will, in effect, preclude delayed planting by weeks.

On the other hand, the other options could be to lower or increase fertilizer dosage to affect maturity, yield and quality.

The studies conducted in Australia tested two options: delayed planting and larger plant stand. The results proved that biotech cotton (Bollgard II) had higher boll retention across all sowing dates and population stands. The Bollgard II variety produced lower yields when it was sown at a delay spread of four weeks. Total fruit retention was only affected by the number of plants per unit area with closer spacing producing fewer fruiting points. In all the trials, later sowing dates for non-Bollgard II varieties consistently produced lower yields. The decline in yield was linear (from the optimal planting date to later planting). It is not surprising that with Bollgard II as well as with the non-Bollgard variety, fiber length and micronaire were affected by the time of sowing. The data showed that with the delay in sowing dates micronaire decreased while fiber length increased. Fiber strength was not affected by variety or sowing dates in any of the experiments. The data showed that sowing of the Bollgard II variety can be delayed by a few weeks without affecting its yield or its fiber quality. Conversely, delayed sowing of a conventional variety canresult in lower yields due to reduced fruit retention. There was also no evidence of yield losses with the Bollgard II varieties at any population density as compared to the non-Bollgard II variety. The experiments conducted showed that growing Bollgard II varieties also requires changes in agronomic practices in order to achieve the maximum benefits of the technology.

What is the Role of Biotechnology in Conventional Breeding?

The cornerstone of conventional breeding is to have or to create genetic variability in the population for the purposes of selection and hybridization. If there is very little or no variability in the population, opportunities for breeders to improve their population will be severely limited. This is why most breeding programs around the world are becoming increasingly concerned about having to work with a narrow genetic base. Minimal exchange of germplasm among countries, coupled with legal prohibitions against the transfer of biotech genotypes are the main factors responsible for the narrowing of the genetic base. Biotechnology has a huge potential to create non-existent traits and variations. Insertion of such special traits/events into promising genotypes for the purpose of commercial use will involve conventional breeding. Crossing and backcrossing will always require professionals to make certain that the new features have been efficiently and accurately transferred to the new genotype. When the science of genetics was born, breeders tried to understand how specific characters could be inserted in the shortest possible time and without losing any of the other benefits of the recipient parent. As the inheritance of characters became better understood, scientists found ways to speed up the breeding process and make it more precise and reliable. With the advent of biotechnology, the precision and reliability of the process has entered a new era of gene tagging and marker assisted breeding, but the objective is the same. Biotechnology will always require screening the segregating generations, in the case of a new trait, and backcrossing, in the case of transferring unique preexistent genes to another variety. Development of a pure and superior genotype utilizing the variability created by biotechnological methods is no different from the principles followed in conventional breeding. Thus conventional breeding and biotechnology are complementary.

Do Biotech Genes Have an Impact on Fiber Quality?

Just as in the case of yield, biotech genes, singly or stacked, have no impact on the genetic ability of the plant to produce better or poorer fiber quality. In the early years of the introduction of biotech cotton in the USA, there were a number of reports that showed stagnation, or even lower fiber quality in the crop. The issue was quickly analyzed and found to be related to the period during which new varieties were released. During the late 1990s, all-out efforts were focused on converting existing varieties into biotech varieties, and these effects slowed the release of new varieties. As soon as the variety release process picked up to a more normal pace, fiber quality concerns automatically disappeared. As shown above, biotech genes can change the location of bolls on the plant. Early boll setting and higher bolls formed on the first positions can have an impact on fiber quality. In the literature, both features are reported to impact quality positively in the form of mature and stronger fibers, and early maturity may certainly result in higher micronaire values. Cotton genotypes with improved fiber quality can be developed and it has long been hoped that biotech cotton with improved quality characteristics will be developed. When it will be developed and what feature will be improved remains uncertain. Quality improvement may not even involve a gene from soil bacterium.

(To be continued....)

Weekly Percent Departures of Rainfall - Monsoon 2013

LEG	EXCESS	NORMAL	DEFICIENT	SCANTY	NO RAIN

S. No.	WEEKS ENDING ON ---> / MET. SUBDIVISIONS	12 JUN 2013	19 JUN 2013	26 JUN 2013	03 JUL 2013	10 JUL 2013
1.	ORISSA	34%	79%	53%	-63%	-42%
2.	HAR. CHD & DELHI	-53%	434%	-89%	-64%	-7%
3.	PUNJAB	7%	854%	-67%	-14%	4%
4.	WEST RAJASTHAN	95%	332%	-90%	-78%	-19%
	EAST RAJASTHAN	170%	196%	-31%	1%	60%
5.	WEST MADHYA PRADESH	195%	268%	50%	107%	40%
	EAST MADHYA PRADESH	143%	166%	58%	185%	-42%
6.	GUJARAT REGION	153%	282%	-73%	-78%	37%
7.	MADHYA MAHARASHTRA	74%	136%	-9%	-46%	-18%
	MARATHWADA	45%	25%	27%	-27%	18%
	VIDARBHA	126%	314%	122%	-40%	-12%
8.	COASTAL ANDHRA PRADESH	134%	-42%	-7%	-77%	43%
	TELANGANA	161%	73%	5%	-59%	8%
	RAYALASEEMA	14%	-89%	-33%	-69%	56%
9.	TAMILNADU & PONDICHERRY	20%	-6%	56%	38%	-21%
10.	COASTAL KARNATAKA	71%	38%	3%	21%	32%
	N. I. KARNATAKA	35%	-43%	-11%	-51%	-10%
	S. I. KARNATAKA	3%	22%	32%	0%	21%

Note: Rainfall Statistics given above is based on real time data receipt and is subject to be updated
(Source: India Meteorological Department)

Clarification

In an article on Incoterms and marine insurance appeared in this bulletin, Issue dated July 2, 2013, it was stated that FOR (Road) up to gate of buyer which is said to be equivalent to CIF. Here CIF means as understood by the traders. But as suggested elsewhere in the article, CIF is more suitable for water transport and not for land transit. The better terms would be CPT, an abbreviation for "Carriage Paid To", a term of sale similar to CFR except that the price quoted includes transportation to the named place of destination (vs port of destination under CFR) and delivery is made to the named carrier at an agreed upon place or even CIP, an abbreviation for "Carriage and Insurance Paid To", a term of sale identical to CIF except that the price quoted includes transportation to the named place of destination (vs port of destination under CIF) and delivery is made to the named carrier at an agreed upon place.

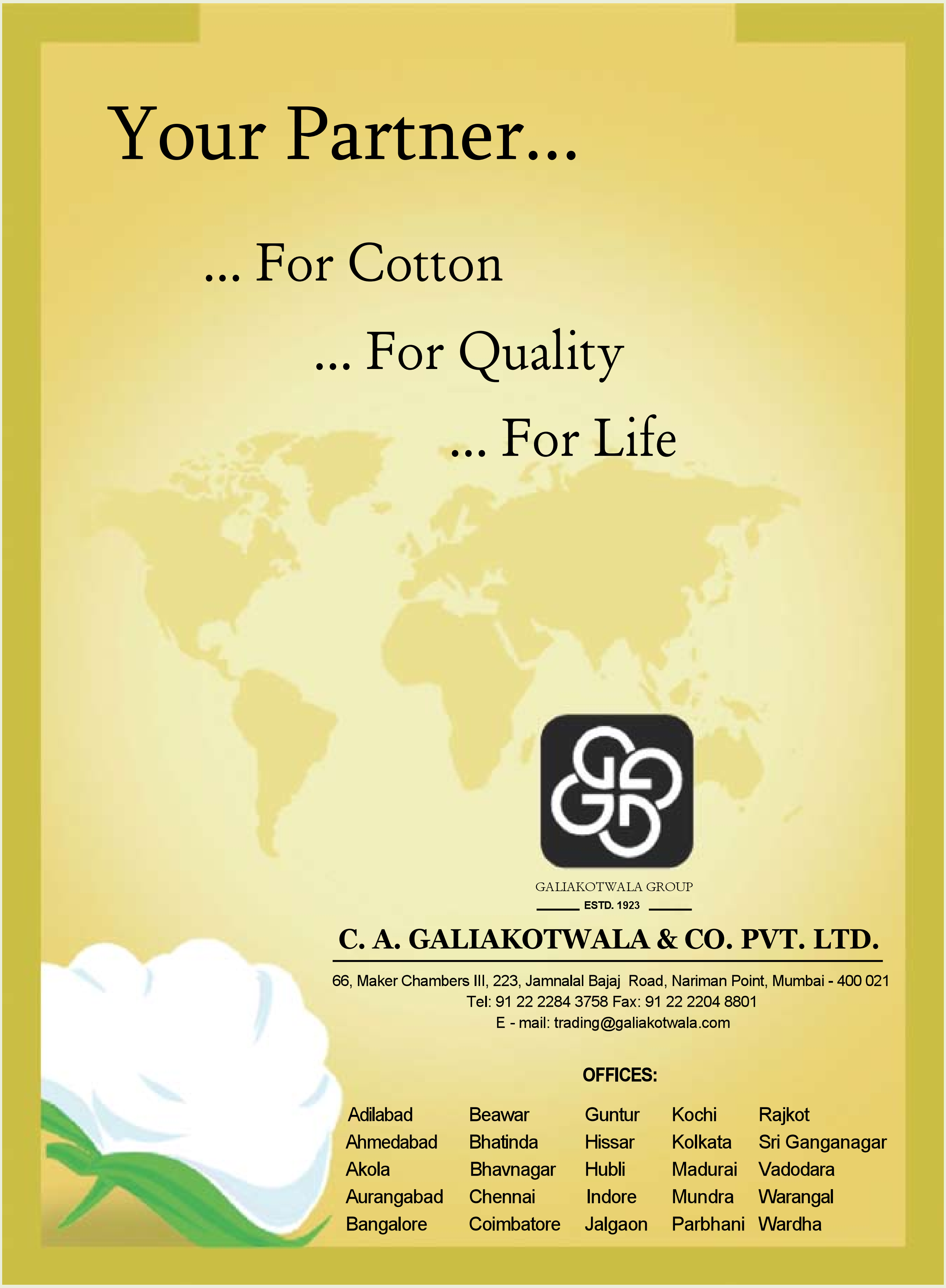
Both CPT and CIP can be used for all modes of transport.

(Shri Rajendra Ganatra)

Update on Cotton Acreage (as on 11.07.2013)

Sl. No	States	Normal of Year*	Normal on Week**	Area Sown (During the corresponding week in)	
				2013	2012
1	2	3	4	5	6
1	Andhra Pradesh	20.09	10.88	13.20	10.94
2	Gujarat	26.97	10.86	22.72	8.57
3	Haryana	5.82	5.19	5.03	5.15
4	Karnataka	5.28	2.19	3.02	1.83
5	Madhya Pradesh	6.55	4.70	6.16	4.54
6	Maharashtra	40.71	25.60	33.48	25.11
7	Orissa	0.98	0.68	0.77	0.76
8	Punjab	5.24	5.50	5.05	5.16
9	Rajasthan	4.18	3.15	2.75	2.80
10	Tamil Nadu	1.28	0.08	0.03	0.06
11	Uttar Pradesh	0	0.25	0.23	0.30
12	West Bengal	0	0	0	0
13	Others	0.43	0	0	0
	Total	**117.53**	**69.08**	**92.44**	**65.22**

* *Normal area mentioned above is average of last three years* ** *It is average of last three years*
(Source: Directorate of Cotton Development, Mumbai)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Cotton Consumption - Cotton Year-wise

(In Lakh Bales)

Month	2006-07	2007-08	2008-09	2009-2010	2010-11	2011-12	2012-13 (P) Oct-May
October	17.33	18.32	16.54	18.13	22.09	17.77	21.95
November	17.81	16.94	16.94	18.47	21.09	18.34	20.94
December	18.49	18.86	17.98	19.49	22.57	20.13	22.75
January	18.22	18.54	16.93	19.54	22.10	20.33	22.92
February	17.11	18.14	16.23	18.81	20.23	20.31	22.04
March	18.39	18.45	17.51	20.01	21.77	20.38	23.30
April	18.06	17.98	17.12	20.53	20.17	20.31	22.75
May	17.89	18.95	17.83	20.93	18.64	21.27	22.64
June	17.85	18.55	18.01	20.71	18.23	21.17	
July	18.42	18.50	18.98	22.11	19.00	22.14	
August	18.58	17.62	18.59	21.73	18.64	22.08	
September	18.03	16.90	18.29	21.42	21.71	21.46	
Total	216.18	217.75	210.96	241.88	246.23	245.47	179.28

(Source: Office of the Textile Commissioner)

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]							Spot Rate (Upcountry) 2012-13 Crop JULY 2013					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	8th	9th	10th	11th	12th	13th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0 – 7.0	15	11079 (39400)	11135 (39600)	11192 (39800)	11192 (39800)	11192 (39800)	11079 (39400)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0 – 7.0	15	11360 (40400)	11417 (40600)	11473 (40800)	11473 (40800)	11473 (40800)	11360 (40400)
3	GUJ	ICS-102	Fine	22mm	4.0 – 6.0	20	8323 (29600)	8323 (29600)	8380 (29800)	8380 (29800)	8323 (29600)	8323 (29600)
4	KAR	ICS-103	Fine	23mm	4.0 – 5.5	21	9308 (33100)	9308 (33100)	9364 (33300)	9364 (33300)	9308 (33100)	9308 (33100)
5	M/M	ICS-104	Fine	24mm	4.0 – 5.5	23	10629 (37800)	10686 (38000)	10742 (38200)	10742 (38200)	10686 (38000)	10686 (38000)
6	P/H/R	ICS-202	Fine	26mm	3.5 – 4.9	26	11614 (41300)	11670 (41500)	11782 (41900)	11838 (42100)	11782 (41900)	11726 (41700)
7	M/M/A	ICS-105	Fine	26mm	3.0 – 3.4	25	10798 (38400)	10798 (38400)	10911 (38800)	10967 (39000)	10911 (38800)	10911 (38800)
8	M/M/A	ICS-105	Fine	26mm	3.5 – 4.9	25	11051 (39300)	11051 (39300)	11164 (39700)	11220 (39900)	11164 (39700)	11164 (39700)
9	P/H/R	ICS-105	Fine	27mm	3.5 – 4.9	26	11754 (41800)	11810 (42000)	11923 (42400)	11980 (42600)	11923 (42400)	11867 (42200)
10	M/M/A	ICS-105	Fine	27mm	3.0 – 3.4	26	11107 (39500)	11248 (40000)	11304 (40200)	11389 (40500)	11332 (40300)	11304 (40200)
11	M/M/A	ICS-105	Fine	27mm	3.5 – 4.9	26	11389 (40500)	11529 (41000)	11585 (41200)	11670 (41500)	11614 (41300)	11585 (41200)
12	P/H/R	ICS-105	Fine	28mm	3.5 – 4.9	27	11810 (42000)	11867 (42200)	11979 (42600)	12035 (42800)	11979 (42600)	11923 (42400)
13	M/M/A	ICS-105	Fine	28mm	3.5 – 4.9	27	11951 (42500)	11951 (42500)	12007 (42700)	12092 (43000)	12035 (42800)	12007 (42700)
14	GUJ	ICS-105	Fine	28mm	3.5 – 4.9	27	11895 (42300)	11895 (42300)	11951 (42500)	12007 (42700)	11951 (42500)	11923 (42400)
15	M/M/ A/K	ICS-105	Fine	29mm	3.5 – 4.9	28	12092 (43000)	12092 (43000)	12148 (43200)	12232 (43500)	12176 (43300)	12148 (43200)
16	GUJ	ICS-105	Fine	29mm	3.5 – 4.9	28	12035 (42800)	12035 (42800)	12092 (43000)	12148 (43200)	12092 (43000)	12064 (42900)
17	M/M/A/K	ICS-105	Fine	30mm	3.5 – 4.9	29	12148 (43200)	12204 (43400)	12260 (43600)	12345 (43900)	12288 (43700)	12260 (43600)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5 – 4.9	30	12288 (43700)	12345 (43900)	12401 (44100)	12457 (44300)	12401 (44100)	12373 (44000)
19	K/A/T/O	ICS-106	Fine	32mm	3.5 – 4.9	31	12429 (44200)	12513 (44500)	12570 (44700)	12626 (44900)	12570 (44700)	12541 (44600)
20	M(P)/ K/T	ICS-107	Fine	34mm	3.0 - 3.8	33	14341 (51000)	14538 (51700)	14622 (52000)	14679 (52200)	14679 (52200)	14679 (52200)

(Note: Figures in bracket indicate prices in Rs./Candy)