Weekly Publication of

Cotton Association of India

COTTON STATISTICS & NEWS

Edited & Published by Amar Singh

2018-19 • No. 16 • 17th July, 2018 Published every Tuesday

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Bt Cotton in India - Current Scenario

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GUEST COLUMN

Dr. Brijender Mohan Vithal
Cotton Expert

Bt cotton is the only genetically-modified crop, presently being cultivated in India which has incorporated cry1Ac gene from the soil bacteria *(Bacillus thuringiensis)*. Major issues about Bt cotton, these days include damages caused by pink boll worm (PBW) and whitefly *(Bemisia tabaci)* to BG II and the possibility of getting substitute of Bt hybrid seeds, the high cost of which is a matter of concern.

A. Pink Bollworm (PBW) Becoming Immune to Bollgard II.

Indian cotton yields are expected to be 9% less in 2017-18 than in the previous year because of pink bollworm (PBW) infestation, though total production could be 11% more due to increased acreage. Over the last three years, reports have emerged of the pink bollworm becoming immune to Bollgard II in India.

In February, 2018, the anti-trust regulator, the Competition Commission of India, decided to probe into anti-competitive practices by Monsanto. At the centre of all this is the pink bollworm infestation plaguing cotton farmers. Even though Bollgard 2, or BG-2, Monsanto's second generation insecticidal technology for cotton, was supposed to protect crops against the pink bollworm, the pest has grown resistant to the toxins produced by this trait. As a result, farmers now spend more on pesticides to control infestations. This, along with the high cost of Bt seeds, is driving farmers to indigence.

A Unique Problem

India is the only Bt cotton-growing country in the world facing the problem of resistance of pink bollworm infestation to the toxins produced by Bollgard II. Interestingly, none of the other 14 Bt cotton-growing countries have seen this resistance. China still successfully controls pink bollworm with first-generation Bt cotton. The U.S. and Australia are moving on to third-generation BG-3 without having faced this problem. Why does India suffer this unique misfortune?

Possible reasons could be as follows:

- Bt hybrids are long-duration hybrids: Cotton researchers broadly agree on the fact that pink

bollworm grew resistant because India restricted itself to cultivating long-duration hybrids since the introduction of Bt cotton in 2002. All other Bt cotton-growing countries mainly grow open-pollinated cotton varieties rather than hybrids.

- Intellectual property laws in India: India is the only country whose intellectual property laws have never prevented its farmers from either saving or selling seeds. Other countries restrict saving and selling of seeds in various degrees. Over 70 countries that are members of the "International Union for the Protection of New Varieties of Plants", allow farmers to reuse seeds from a protected plant variety, but not to sell them. In the U.S., where plant varieties are patented, the patented seeds cannot even be reused. Without such protections, several seed companies in India prefer hybrids, because unlike open-pollinated varieties, hybrids lose their genetic stability when their seeds are replanted. This compels farmers to repurchase seeds each year, protecting corporate revenues.

- En mass shift to open-pollinated Bt option by Indian farmers: When Monsanto introduced Bt cotton in India, the technology was so popular that cotton farmers shifted to it en masse. But because there was no open-pollinated Bt option, they were also forced to shift en masse to hybrids. From 2002 to 2011, the area under cotton hybrids rose from 2% in North India and 40% elsewhere to 96% across the country. This shift had consequences, says Dr. Keshav Raj Kranthi, former Director of the Central Institute for Cotton Research and currently at the International Cotton Advisory Committee in Washington, DC.

- Bigger and bushier plant type: Not only that hybrids are expensive, but they are also bigger and bushier, forcing Indian farmers to cultivate them at low densities — 11,000 to 16,000 plants per hectare. This is suboptimal in countries like the U.S. and Brazil, that plant cotton at 80,000 to 100,000 per hectare.

- Hemizygous Bt hybrids: Dr. Kranthi also says that the introduction of the Bt gene into only one parent of Indian hybrids, as is the practice, is itself a problem. The resulting hybrids are hemizygous, which means that they express only one copy of the Bt gene. So, they produce cotton bolls that have some seeds toxic to the pink bollworm and some that are not. This can be contrasted with the homozygous seeds of open-pollinated varieties as in the U.S., China or Australia, which have 100% toxic seeds. The problem with hemizygous hybrids is that they allow pink bollworms to survive on toxin-free seeds when they are vulnerable new born. Though this is only a hypothesis, but other pink bollworm experts say it's reasonable.

- Non-termination of crop: Indian farmers grow their cotton crop longer so that they produce enough cotton. The pest does its most damage in the latter half of the cotton-growing season and does not consume any other crop that grows then. So, the long duration of Indian cotton crops, between 160 and 300 days, allows this pest to thrive and evolve resistance more quickly than it can for short-duration crops. Contrast this with other cotton-growing countries which strictly terminate the crop within 160 days.

- Crop rotation: As farmers in Maharashtra have small holdings, they rarely adopt crop rotation. They grow the same crop (cotton) year after year. This provides needed continuity of the host for the pest.

- Use of unapproved and unauthorised Bt seeds: The Government of India has accepted that 8-10% Bt cotton cultivars being cultivated in India have not been approved but are illegally grown by farmers. Cultivation of such cultivars provides better environment for resistance development.

- Use of F2 seeds of approved BG II cotton hybrids: F1 bolls of BG II cotton hybrids carry both genes viz. Cry 1AC and Cry 1AB, while about half of the next generations of plants do not carry both the genes. This leads to a situation where resistance development becomes easy.

- Non-compliance of refugia: Most of the farmers avoid cultivation of non Bt refuse planting as they do not want to lose their yields from those areas. Thus, artificial refugia plantation which is mandatory to avoid resistance development is not followed in India appropriately. Under such circumstances, the pink bollworm population constantly gets Bt protein crop which favours the development of resistance. PBW is mostly monophagous thus risk of resistance development is much higher in this case when PBW could be under evolutionary pressure to develop resistance.

- Lack of Integrated Pest Management (IPM): One of the important reasons of development of resistance is that farmers do not feel the necessity to initiate control measures against any bollworm on Bt cotton as they think that Bt is panacea to total management. In fact, Integrated

Pest Management (IPM) practices for Bt cotton is equally important.

- Storage of seeds: Another reason for development of resistance, is that in most ginning factories, seeds are stored without proper sanitation practices. This leads to survival of pest and continuation of the PBW life cycle.

- Other factors that led to India's unique trajectory: First, when Monsanto licensed its BG and BG-2 traits to Indian seed companies, the agreement restricted the introduction of these traits to hybrids only. Second, hybrids are financially more attractive to Indian seed companies because they offer a "value capture mechanism".

Proposed Solution to the Problem

All these factors combine with the pink bollworm's biology, to create a perfect storm of conditions for resistance.

- Dr. Kranthi says the only solution to the problem is to move swiftly to short-duration varieties. This is where Monsanto's first-generation Bollgard comes in. Seed companies cannot develop open-pollinated varieties with BG-2, but they can develop with BG, since Monsanto didn't patent BG in India

- A solution suggested by the National Seed Association of India is for the government to encourage a move back to Bollgard. Both BG, which has a single bacterial gene called CryA1C, and BG-2, which has CryA1C and Cry2AB2, are designed to protect against the pink bollworm. BG began failing against the pest in 2009, while BG-2 began failing in 2014.

B. Delhi High Court Dismissed Monsanto's Plea to Enforce Bt Cotton Seed Patent

- The Delhi High Court on 10/03/2018 said Monsanto NSE -0.23 % Technologies' patents on Bt cotton seed varieties Bollgard and Bollgard II were not valid and dismissed its claims against Nuziveedu Seeds on this count, a finding that will likely have far-reaching consequences for the agriculture sector.

- The court was hearing a set of appeals filed by Monsanto and Nuziveedu along with the latter's group companies — Prabhati Agri Biotech and Pravardhan Seeds. Monsanto was given three months to appeal to the Protection of Plant Varieties and Farmers' Rights Authority for relief under the Protection of Plant Variety and Farmers Right Act. Monsanto decided to approach Supreme Court in this regard.

- The government in March 2018 revised Bt cotton seed prices to Rs. 740 per packet of 450 grams each, including trait value of Rs. 39, which seed companies pay to Monsanto Mahyco Biotech (India).

Feedback

The feedback has been mixed as the following comments show:

- "The best days of the cotton revolution seem to be over as Bollgard III will not come to the country and cotton will face increasing pest attacks," said Ashok Gulati, former Chairman, Commission for Agricultural Costs & Process (CACP).

- "A country that cannot respect intellectual property rights (IPR) can never be a country of innovators. Global companies will shirk to bring best technologies here if IPR is not protected." The decision may imperil India's cotton farmers, said one of the country's foremost Agricultural Economists.

- The judgment of Delhi High Court declaring that plant varieties and seeds can't be patented will protect the rights of farmers and ensure the country's food security, said Kalyan Goswami, Director General, National Seed Association of India (NSAI).

C Bt Cotton Varieties

Seeds of genetically-modified varieties instead of Bt hybrids can be reused by farmers with no commercial restrictions. It reduces cost of cotton cultivation, as farmers can reuse their own seeds instead, year after year.

Two major issues associated with Bt hybrids v/s Bt varieties are that:-

- High cost of Bt hybrid cotton seeds as compared to Bt Varieties.

- If farmers use next generation (F2) seeds obtained from Bt hybrids from their own crops, they do not get similar seed cotton yields and pest resistance levels as that observed in F1 seeds

The only solution to these problems is the incorporation of Bt genes in well adopted high yielding varieties of cotton having good fibre parameters. With this background, first hirsutum

group (medium staple) Bt variety (Bikaneri Narma) was released in 2008 and first Bt. hybrid NHH 44 Bt in 2009 by the ICAR, but these did not perform well as compared to popular Bt hybrids.

Thus, ICAR Institutions and State Agricultural Universities in India have been putting in their efforts to produce varieties which may compete with Bt hybrids of cotton. Updated information about progress made in this direction is as follows:-

- Recently, Punjab Agricultural University (PAU) in Ludhiana has claimed the development of First Genetically Modified (GM) varieties of cotton – PAU Bt 1 and F1861.

- The Indian Council of Agricultural Research (ICAR) also has identified three Bt cotton varieties –F1861, PAU Bt 1 and RS 2013 for cultivation in Punjab, Haryana and Rajasthan.

Key Facts

1. The genetic modification of cotton involves introduction of the Bt bacterial gene that codes for a protein which kills the bollworm cotton pest.

2. All three varieties carry the Cry1Ac gene obtained from Bt (Bacillus thuringiensis) bacteria which imparts resistance against bollworm cotton pest.

3. Besides, seeds of these three genetically-modified varieties can be reused by farmers with no commercial restrictions. It will aid in savings on repeat seed purchases every season.

4. The PAU Bt 1 variety was completely developed at PAU, whereas the F1861 and RS 2013 were converted to Bt version by Central Institute for Cotton Research (CICR), Nagpur.

D. Whitefly Attacks in Punjab and Haryana Cast Black Clouds Over Bt Cotton

Whitefly (Bemisia tabaci) is an important sucking insect pest of cotton. Its infestation occurs in early as well as in late stage of cotton crop. It also transmits the Leaf Curl Virus (LCV) disease in cotton.

'The Times of India', on September 2015, reported that farmers in Punjab and Haryana were perturbed over the attack of the whitefly on their Bt cotton crop. The bollworm attack had led farmers to shift to Bt cotton post 2004, which resisted the pest. But the whitefly has shown that the Bt cotton is vulnerable too, creating a crisis at a time when the monsoon has failed.

The whitefly pest, that wrecked Punjab's cotton harvest during 2015-16, started spreading fast in the fields of Abohar and Fazilka (Punjab) during July 2016-17. The infestation had increased from five to seven flies per leaf during June that year to more than 25 flies per leaf. While a substantial area sown under cotton came under attack of whitefly in Punjab and Haryana, farmers who shifted from pulses and edible oilseeds to sow cotton for better realisation were disappointed with a possible decline in their income. Farmers in many parts of Punjab and Haryana even uprooted cotton for other crops.

The natural enemies of white fly are generally more susceptible to insecticides, than the white fly iyself. As per reports available unlike their natural enemies, white flies have wax coating over the body which protects them against insecticides. Since whiteflies lay eggs in the middle section of the plant, on the underside of leaves, top sprays often miss these. This natural mechanism helps the pest to create havocs.

E Bt Cotton Coverage in India:-

As of date, more than 2000 Bt hybrids have been approved by GEAC for commercial cultivation in the states of Punjab, Haryana and Rajasthan in the North zone; Madhya Pradesh, Maharashtra and Gujarat in the Central zone and Telangana, Andhra Pradesh, Karnataka and Tamil Nadu in the South zone. More than 30 private seed companies are producing and marketing Bt hybrids to fulfill the requirements.

The area under Bt cotton cultivation, which was hardly 0.29 lakh ha (0.38 %) out of 76.70 lakh in 2002-03, increased to 119.40 lakh ha out of 128.19 lakh hectares in 2014-15 showing more than 93.14 % adoption within a span of 13 year. Damages caused by PBW and Whitefly during recent years created a situation that the share of Bt crop in total cotton area sown during 2016-17 (108.26 lakh ha) declined to about 82-83%. The remaining area was sown under desI varieties and a very small area is under other hybrids.

F Area/Production Estimates

The second meeting of the Cotton Advisory Board for the Cotton Season 2017-18, was held on 16.06.2018. CAB estimated area under cotton as 128.26 lakh ha during 2016-17 (Production-540 lakh bales) and 124.44 lakh ha (Provisional) during 2017-18 (Production-525 lakh bales- Provisional)

This article is based on information I have gathered during my lifelong service in R&D activities on cotton and collected from public and private publications, for the benefit of our readers.

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(The views expressed in this column are of the author and not that of Cotton Association of India)

Production of Fibres

(In Mn. Kg)

As on	Raw Cotton (Oct.-Sept.)	Synthetic			Cellulosic	Sub Total
		PSF	ASF	PPSF	VSF	
2016-17 (P)	--	898.97	96.37	3.64	364.99	1363.97
2017-18 (P)	--	852.31	93.20	3.51	369.82	1318.84
2018-19 (P) (Apr.)	--	64.90	7.36	0.32	31.04	103.62
2016-17 (P)						
April	--	73.56	8.86	0.37	30.32	113.11
May	--	77.07	9.39	0.44	31.72	118.62
June	--	77.46	9.28	0.45	21.87	109.06
July	--	79.32	8.07	0.30	30.41	118.10
August	--	79.92	8.20	0.35	31.96	120.43
September	--	76.96	9.02	0.22	31.14	117.34
October	--	79.51	6.75	0.16	32.46	118.88
November	--	71.06	7.10	0.24	31.18	109.58
December	--	71.65	7.28	0.29	32.09	111.31
January	--	72.68	7.78	0.20	32.11	112.77
February	--	63.78	7.42	0.20	28.24	99.64
March	--	76.00	7.22	0.42	31.49	115.13
2017-18 (P)						
April	--	72.23	7.62	0.26	30.51	110.62
May	--	75.90	7.79	0.32	29.59	113.60
June	--	71.90	7.65	0.24	31.55	111.34
July	--	75.73	8.47	0.13	35.52	119.85
August	--	73.58	9.49	0.32	33.14	116.53
September	--	68.92	8.42	0.32	29.35	107.01
October	--	70.40	8.84	0.32	32.86	112.42
November	--	72.26	7.69	0.32	31.30	111.57
December	--	70.10	7.00	0.32	30.84	108.26
January	--	72.36	6.17	0.32	30.89	109.74
February	--	61.04	7.00	0.32	26.06	94.42
March		67.89	7.06	0.32	28.21	103.48
2018-19 (P)						
April	--	64.90	7.36	0.32	31.04	103.62

(P)= Provisional

Source : Office of the Textile Commissioner

Tightening Markets and Trade Policies

Growing demand for cotton, concerns for the 2018/19 production and changing trade policies – including additional tariffs on cotton – are contributing to uncertainty for the global outlook. The current estimate for world cotton production in 2017/18 is 26.6 million tonnes with consumption estimated at 26.2 million tonnes. Both global production and consumption have grown from the previous season with current estimates reflecting a 15% growth in production and a 7% growth for global consumption. Production increases have been estimated for all major countries and regions coming from area increases (a 16% increase in global cotton area) with no change estimated in productivity.

While both production and consumption are projected to increase in 2017/18, higher production will result in world stocks increasing 3% to 19.3 million tonnes, following two seasons of continual decreases in global stocks. Consumption in 2018/19 is projected to grow 5% to 27.4 million tonnes with production projected at 25.9 million tonnes. With consumption expected to outpace production in 2018/19, global stocks are expected to decrease to 17.8 million tonnes.

Consumption in China in 2017/18 is estimated at 8.7 million tonnes. With production estimated at 5.9 million tonnes and imports at 1.2 million tonnes, stocks in China are expected to decrease to 9.1 million tonnes by the end of 2017/18. Chinese reserve sales, now limited to textile mills for final use, have slowed and are expected to continue into mid-September. In 2018/19, China's cotton consumption is projected to increase to over 9 million tonnes. This comes with an expected production decrease of 6% to 5.6 million tonnes. To meet rising consumption needs, Chinese imports are expected to rise in 2018/19 to 1.6 million tons with the China National Development and Reform Commission issuing an additional 800,000 tonnes of cotton import quota subject to sliding scale tariffs.

However, amidst growing demand across Asian and South Asian economies, and production declines in major producers projected for 2018/19, global trade policy issues pose a potential impact for the sector. Possible sanctions that include the United States, the world's largest exporter (3.4 million tonnes in 2017/18) and China, the world's largest consumer of cotton lint, may lead to increased tariffs on a range of goods and commodities including cotton. Uncertainty in global trade policies may have broad effects, disrupting stability in global trade and economic growth.

Global cotton trade is estimated to grow 10% in 2017/18 to 9 million tonnes and projected to reach 9.3 million tonnes in 2018/19. In 2018/19, leading exporters are expected to be; the United States with 3.3 million tonnes, the West Africa region with 1.3 million tonnes and Brazil with over 1 million tonnes. During 2016/17, the United States exported 500 thousand tonnes of cotton to China, accounting for about 15% of total cotton exports by the United States and for about 45% of total cotton imports by China.

Exports by West Africa in 2017/18 are estimated at a ten year high of 1.05 million tonnes with projected increase to 1.3 million tonnes in 2018/19, based on both area (3%) and productivity (3%) increases. Production by Australia in 2017/18 is estimated above 1 million tonnes while production by Brazil could reach almost 2 million tonnes. Early projections for Brazilian production and exports in 2018/19 indicate an increase, while estimates for Australia will likely decrease. Drought conditions are affecting an important portion of USA production in 2018/19. Indian production in 2018/19 is estimated at 5.9 million tonnes with lower planted area (-3%) and possible decreases in yields (-1%).

Tight supplies in a growing demand market have led to rising prices at the beginning of the month, where the international reference price was trending upward, reaching a season high of 102 cents per pound. With uncertainty in trade policies over the past few weeks, price has decreased but still above the season average thus far of 87 cents per pound and above a twenty-year historical average of 73 cents per pound. The ICAC price forecast for 2017/18 is 86 cents per pound. For 2018/19, the Secretariat is projecting the average price to end between 66 and 107 cents per pound.

Source : ICAC Cotton This Month, July 2, 2018

Supply and Distribution of Cotton

July 2, 2018

Seasons begin on August 1 — Million Metric Tons

	2013/14	2014/15	2015/16	2016/17 Est.	2017/18 Proj.	2018/19 Proj.
BEGINNING STOCKS						
WORLD TOTAL	**19.428**	**21.331**	**22.967**	**20.312**	**18.80**	**19.28**
China	10.811	13.280	14.118	12.650	10.63	9.10
USA	0.827	0.512	0.795	0.827	0.60	0.98
PRODUCTION						
WORLD TOTAL	**26.225**	**26.235**	**21.476**	**23.075**	**26.63**	**25.94**
India	6.766	6.562	5.746	5.865	6.15	5.94
China	7.000	6.600	5.200	4.900	5.89	5.55
USA	2.811	3.553	2.806	3.738	4.55	4.24
Pakistan	2.076	2.305	1.537	1.663	1.80	2.00
Brazil	1.734	1.563	1.289	1.530	1.96	1.98
Uzbekistan	0.910	0.885	0.832	0.789	0.80	0.80
Others	4.928	4.767	4.066	4.590	5.48	5.42
CONSUMPTION						
WORLD TOTAL	**24.101**	**24.587**	**24.139**	**24.516**	**26.15**	**27.42**
China	7.600	7.550	7.600	8.000	8.65	9.04
India	5.087	5.377	5.296	5.148	5.31	5.36
Pakistan	2.470	2.467	2.147	2.147	2.35	2.46
Europe & Turkey	1.611	1.692	1.687	1.612	1.63	1.85
Bangladesh	1.129	1.197	1.316	1.409	1.55	1.78
Vietnam	0.673	0.875	1.007	1.168	1.37	1.54
USA	0.773	0.778	0.751	0.708	0.73	0.74
Brazil	0.862	0.797	0.660	0.690	0.72	0.73
Others	3.896	3.854	3.675	3.635	3.84	3.91
EXPORTS						
WORLD TOTAL	**9.015**	**7.764**	**7.532**	**8.185**	**8.99**	**9.32**
USA	2.293	2.449	1.993	3.248	3.44	3.34
India	2.015	0.914	1.258	0.991	1.10	0.91
CFA Zone	0.973	0.966	0.963	0.972	1.04	1.30
Brazil	0.485	0.851	0.939	0.607	0.90	1.07
Uzbekistan	0.615	0.550	0.500	0.403	0.34	0.44
Australia	1.058	0.527	0.616	0.812	0.91	0.79
IMPORTS						
WORLD TOTAL	**8.858**	**7.800**	**7.575**	**8.125**	**8.99**	**9.32**
Bangladesh	1.112	1.183	1.378	1.412	1.66	1.75
Vietnam	0.687	0.934	1.001	1.198	1.57	1.61
China	3.075	1.804	0.959	1.096	1.24	1.57
Turkey	0.924	0.800	0.918	0.801	0.82	0.83
Indonesia	0.651	0.728	0.640	0.746	0.87	0.85
TRADE IMBALANCE 1/	-0.157	0.036	0.042	-0.060	0.00	0.00
STOCKS ADJUSTMENT 2/	-0.063	-0.047	-0.034	-0.013	0.00	0.00
ENDING STOCKS						
WORLD TOTAL	**21.331**	**22.967**	**20.312**	**18.798**	**19.28**	**17.80**
China	13.280	14.118	12.650	10.632	9.10	7.16
USA	0.512	0.795	0.827	0.599	0.98	1.15
ENDING STOCKS/MILL USE (%)						
WORLD-LESS-CHINA 3/	**49**	**52**	**46**	**49**	**58**	**58**
CHINA 4/	**175**	**187**	**166**	**133**	**105**	**79**
COTLOOK A INDEX 5/	**91**	**71**	**70**	**83**	**87**	

1/ The inclusion of linters and waste, changes in weight during transit, differences in reporting periods and measurement error account for differences between world imports and exports.
2/ Difference between calculated stocks and actual; amounts for forward seasons are anticipated.#
3/ World-less-China's ending stocks divided by World-less-China's mill use, multiplied by 100.
4/ China's ending stocks divided by China's mill use, multiplied by 100.
5/ U.S. Cents per pound

Source : ICAC Cotton This Month, July 2, 2018

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	Spot Rate (Upcountry) 2017-18 Crop JULY 2018 9th	10th	11th	12th	13th	14th
	Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]											
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	12598 (44800)	12598 (44800)	12598 (44800)	12598 (44800)	12598 (44800)	12598 (44800)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	12738 (45300)	12738 (45300)	12738 (45300)	12738 (45300)	12738 (45300)	12738 (45300)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	8830 (31400)	8830 (31400)	8802 (31300)	8802 (31300)	8886 (31600)	8886 (31600)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	10151 (36100)	10151 (36100)	10123 (36000)	10123 (36000)	10208 (36300)	10208 (36300)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	10995 (39100)	10995 (39100)	10967 (39000)	10967 (39000)	11051 (39300)	11107 (39500)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	12935 (46000)	12963 (46100)	12963 (46100)	12963 (46100)	13132 (46700)	13132 (46700)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	10320 (36700)	10320 (36700)	10292 (36600)	10320 (36700)	10489 (37300)	10545 (37500)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	10911 (38800)	10911 (38800)	10882 (38700)	10911 (38800)	11051 (39300)	11135 (39600)
9	P/H/R	ICS-105	Fine	27mm	3.5.4.9	26	12991 (46200)	13020 (46300)	13020 (46300)	13020 (46300)	13188 (46900)	13188 (46900)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	10826 (38500)	10826 (38500)	10798 (38400)	10826 (38500)	10995 (39100)	11051 (39300)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	11360 (40400)	11360 (40400)	11332 (40300)	11360 (40400)	11501 (40900)	11585 (41200)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	13048 (46400)	13076 (46500)	13076 (46500)	13076 (46500)	13244 (47100)	13244 (47100)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	12373 (44000)	12373 (44000)	12345 (43900)	12373 (44000)	12513 (44500)	12598 (44800)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	12907 (45900)	12907 (45900)	12879 (45800)	12935 (46000)	13076 (46500)	13216 (47000)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	12935 (46000)	12935 (46000)	12907 (45900)	12935 (46000)	13076 (46500)	13160 (46800)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	13301 (47300)	13301 (47300)	13273 (47200)	13357 (47500)	13498 (48000)	13638 (48500)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	13385 (47600)	13385 (47600)	13357 (47500)	13385 (47600)	13526 (48100)	13610 (48400)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	13666 (48600)	13610 (48400)	13582 (48300)	13610 (48400)	13751 (48900)	13835 (49200)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	14088 (50100)	14088 (50100)	14060 (50000)	14088 (50100)	14229 (50600)	14313 (50900)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	17350 (61700)	17350 (61700)	17322 (61600)	17350 (61700)	17434 (62000)	17491 (62200)

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