Weekly Publication of

Cotton Association of India

COTTON STATISTICS & NEWS

Edited & Published by Amar Singh

2024-25 • No. 43 • 21st January, 2025 Published every Tuesday

Cotton Exchange Building, 2nd Floor, Cotton Green, Mumbai - 400 033
Telephone: 8657442944/45/46/47/48 Email: cai@caionline.in
www.caionline.in

Microbial Volatile Attractants for Monitoring And Managing Sucking Pests In Cotton

EXPERT's Column

Dr. Y. G. Prasad
Director, ICAR-Central Institute for Cotton Research, Nagpur.

Dr. Y. G. Prasad received his PhD in Entomology from the Pusa Institute, New Delhi and currently works as Director, (CICR), Nagpur. Dr Prasad is on the Board of Management of State Agricultural Universities (Dr PDKV, Akola and NAU, Gujarat); Steering group member of Digital India Corporation, Meity, GoI, on digital solutions initiatives for North East India. As an Entomologist, he has extensive experience in IPM, pest forecasting and climate change adaptation. Steering country-wide implementation of large-scale demonstrations on HDPS cotton under special project in 8 cotton growing states in PPP mode. He has published research on IPM, microbial pest control, climate-smart agriculture, and developed crop pest decision support systems

Dr. K. Velmourougane
Principal Scientist ICAR-Central Institute for Cotton Research, Nagpur.

Dr. K. Velmourougane received his PhD in Microbiology (Gold medal) from the Indian Agricultural Research Institute (IARI), New Delhi and currently works as a Principal Scientist at the ICAR-Central Institute for Cotton Research, Nagpur. As an agricultural microbiologist with 27 years of research experience, he has wide knowledge on Plant-Soil-Microbiome interactions including, development of bioinoculants to soil health and cotton productivity, microbial biofilm-based formulation to mitigate biotic and abiotic stress, microbial-based volatiles for enhancing crop growth and management of pest and diseases of cotton, microbial technologies for scientific valorization of cotton wastes, and soil biological quality assessment.

Cotton is an important natural fibre crop of India, which provides fibre to the textile industries and supplies oil and feed to society. In India, cotton is grown in an area of 13 million hectares. Although India accounts for a higher acreage of the world cotton area, the average cotton productivity is noticeably lower at approximately 484 kg lint/ha as compared with the world average of 765 kg/ha. Although low cotton productivity is mainly attributed to fluctuations in the monsoon season coupled with low soil fertility, insect pests are also major factors affecting cotton production in India. Although the introduction and adoption of Bt cotton has been found to be successful in the management of bollworm complexes in cotton, it has led to the introduction of several other insect pests, especially sucking pests (whiteflies, jassids, aphids, thrips) during flowering and boll formation phase due to reductions in pesticide sprays at early stages. Furthermore, sucking pests that are not susceptible to Cry1Ac showed resurgence in many parts of the world due to the reduction in insecticide sprays. Currently, more than 95% of the areas in India are under Bt cotton, which is susceptible to sucking pests, resulting in significant yield and quality loss in cotton.

Among sucking pests, whiteflies (Bemisia tabaci) are a deadly pest that spread throughout the growing season and cause significant yield loss in cotton, apart from acting as a vector for several diseases, including cotton leaf curl virus disease (CLCuD). Jassid (Amrasca biguttula) is a phloem-feeding insect that causes severe damage to cotton plants via sap sucking. Both nymphs and adults cause economic damage to cotton by injecting toxic compounds into the leaf tissues, resulting in the burning of leaves, drying, and shedding. Aphids (Aphis gossypii) are a deadly pest that spread throughout the growing season and cause significant yield loss in cotton. Aphids are polyphagous pests found on more than 700 plant species, including cotton, citrus, coffee, cocoa, eggplant, cucumber, melon, pepper and many ornamental plants. Cotton aphid is distributed throughout the world, but it is more common in tropical regions. Aphids have a complex life cycle, with winged and wingless forms, and they reproduce exponentially through parthenogenesis. Cotton aphids are important vectors of viral diseases and can transmit more than 50 viruses, including cucumber mosaic virus. Aphid infestation causes damage by piercing and sucking leaves, causing deformation, decreased photosynthesis activity, and subsequent leaf defoliation. Nymphs and adults extract nutrients from plants and disturb the availability of growth hormones that are critical for plant growth and yield. Further, the excess sap sucked from plants by aphids is secreted in the form of honeydew, making the plants sticky with sugary excretions that invite fungal infestations.

Thrips (Thrips tabaci) is an important early-season cotton pest that causes seedling death through its "punch and suck" mouth parts, which punch holes in leaf cells and suck cellular fluids. Although thrips are the smallest of all cotton insect pests, this cryptic and polyphagous pest can cause significant damage to cotton by affecting cotton seedlings, causing stunted growth, poor crop stand, delays in boll formation, and substantial yield loss. Cotton is most susceptible to thrips injury between the emergence and 3-4 leaf stage, as its seedling terminal buds develop relatively slowly. Heavily injured leaves have a ragged (crinkled, distorted, thickened, blistered) appearance, with visible silvery feeding sites with leaf margins curling upward, and will eventually turn bronze and defoliate prematurely with prolonged feeding. In addition to direct injury, thrips act as vectors of several plant pathogenic viruses and bacteria. Thrips is active throughout the cotton season and inhabits several other alternate hosts (eggplant, pepper, onion, potato, garlic, cabbage, beans, papaya, chilli, shallot, cauliflower, etc.).

To manage sucking pests, cotton farmers largely depended on conventional insecticides. However, the continuous and indiscriminate use of insecticides in cotton has resulted in the resistance of pests to insecticides, and they have developed resistance to major classes of insecticides, including organophosphates, carbamates, synthetic pyrethroids, and relatively newer insecticides, such as neonicotinoids and spinosyn. In addition to resistance development in sucking pests, environmental pollution in terms of the accumulation of pesticide residues in soils, adverse effects on natural enemies (predators and parasitoids), and the resurgence of minor pests were also reported in cotton cultivation in India.

In this context, farmers are looking for alternative sustainable, ecofriendly, cost-effective sucking pest management options for cotton. As India is a major producer of organic cotton, the worldwide demand for organically grown cotton forces farmers to use ecofriendly and non-chemical approaches to manage insect pests in cotton. Furthermore, stringent regulations from global regulatory bodies and governments are being introduced to promote sustainable agricultural practices over chemical-based agricultural inputs. Further government schemes, such as Pradhan Mantri Krishi Sinchai Yojana and the National Mission of Sustainable Agriculture, promote sustainable agricultural practices over Chemical-based agri-input.

Among eco-friendly pest management strategies, biological control plays a vital role as a non-chemical approach and an integral part of pest management in crops. Several beneficial insects/natural enemies, including predators, parasitoids and entomopathogens, play an important role in limiting the population of pests. Several predators and parasitoids predate and parasitize cotton pests, including the bollworm complex and sucking pests. However, no mechanism has been developed to effectively enhance field populations of beneficial insects. Similarly, the use of plant-based volatiles has been reported to manage sucking pests' infestation; however, they were not widely accepted by farmers due to their low field efficacy and high costs. Likewise, although yellow sticky traps (YST) have been popularly used as mechanical control options for sucking pests, the expected field attraction of sucking pests has not yet been achieved. Hence, enhancing the attraction of sucking pests to YSTs is expected to be useful for cotton farmers.

In recent years, microbial volatile organic compounds (mVOCs) have represented a new frontier in bioprospecting, where they produce complex volatile compounds, which are defined as compounds that have high enough vapour pressures under normal conditions to significantly vaporize and enter the atmosphere. Although several thousand volatiles emitted by plants have been identified so far, only several hundred compounds have been identified from microorganisms. Chemical ecologists consider mVOCs as potential semiochemicals that function as attractants and repellents to insects. Some mVOCs attract or repel insects, inhibit the growth of microorganisms competing with associated insects, stimulate oviposition, mimic plant hormones, or even induce plant resistance. mVOC emission is now recognised as an important aspect of plant-microorganism interactions. Recently, a few studies have shown the wealth of mVOCs for the modulation of crop growth, development, defense, and inter- and intraspecific communication. Insects exhibit strong aggregation behaviors to specific microbial communities, although few researchers have reported mVOCs directly as pheromonal communications as a signal for food sources, oviposition sites, or mating opportunities. Although substantial advancement has been made in our understanding of mVOCs and their multifunctional roles in crop growth promotion, including biocontrol of insects under laboratory conditions, we remain far from implementing that knowledge under field conditions. Till date, no microbial-based volatile attractant has been utilized for sucking pests' attraction or its management under field scale. In the era of the promotion of non-chemical agriculture, the applicability of microbial-based volatile attractants in agriculture has great potential to reduce cultivation costs and improve the environment.

To manage sucking pests in cotton, the ICAR-Central Institute for Cotton Research (CICR) has developed an ecofriendly, cost-effective, sustainable bacterial-based synthetic volatile attractant formulations, namely ICAR-CICR Whitefly Attractant (ICAR-CICR-BVW), ICAR-CICR Jassid Attractant (ICAR-CICR-BVJ), ICAR-CICR Aphid Attractant (ICAR-CICR-BVA), and ICAR-CICR Thrip Attractant (ICAR-CICR-BVT), which, on three-year large-scale field studies at ICAR-CICR and 2-year multi-location evaluations in 15 AICRP (Cotton) centres, proved to effectively manage cotton sucking pests through their attraction to the YST (attract and kill) (Fig. 1). The attractant formulations, ICAR-CICR-BVW, ICAR-CICR-BVJ, ICAR-CICR-BVA, and ICAR-CICR-BVT

Fig.1 Field deployment of bacterial-based volatile attractant

Fig. 2 Effect of volatile attractants on sucking pest attraction efficiency toward YST (Mean of 5 years data). a, whitefly; b, jassid, c, aphid; d, thrips.

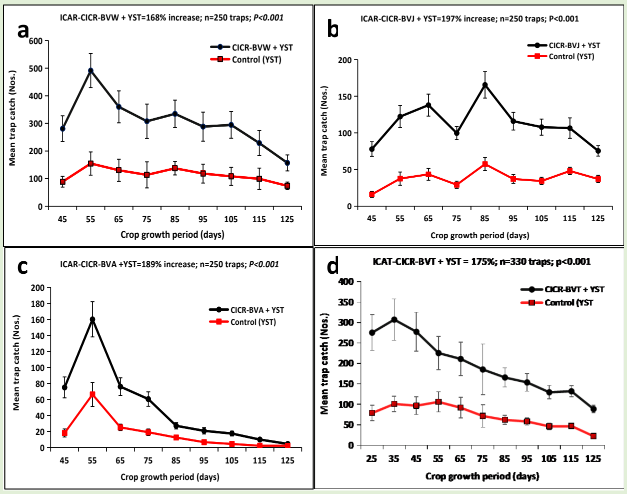
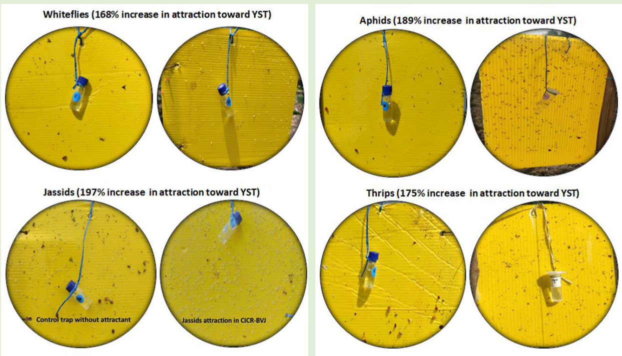


Fig. 3 Effect of volatile attractants on sucking pest attraction efficiency toward YST



achieved attraction efficiency increases of 168%, 197%, 189%, and 175% over the control (only YST), respectively, for whiteflies, jassids, aphids and thrips (Fig. 2 and 3). The use of volatile attractant formulations also significantly increased seed cotton yield compared to the control without attractants (Fig. 4). Further, to enhance the attraction of natural enemies to cotton fields, ICAR- CICR, has developed a bacterial-based beneficial insect attractant formulation designated as ICAR-CICR-BVBI for enhanced attraction of beneficial insects (Predators and

Fig. 4 Volatile Attractants on seed cotton yield – Multilocational evaluation (Mean of 5 years

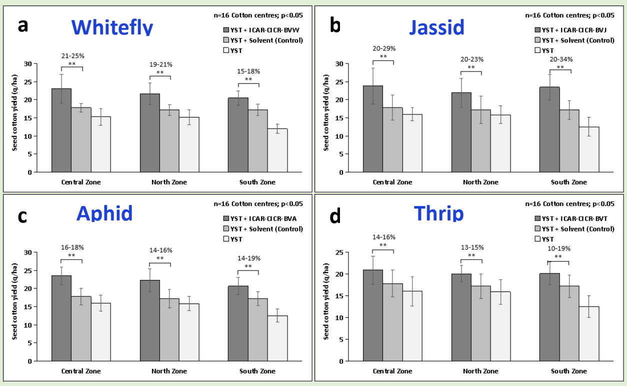
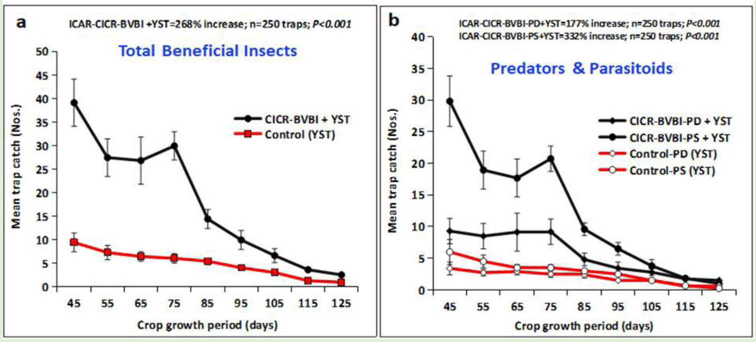


Fig. 5 Volatile attractant on beneficial insects' attraction efficiency (Mean of 5 years data)



parasitoids) to cotton fields, which will aid in biological control of cotton pests. Three-year large-scale field studies at CICR and 2-year multi-location evaluation (15 AICRP-Cotton centres), proved to enhance beneficial insects' population to 268% in cotton fields compared with the control (Fig. 5).

In addition to managing sucking pests, the developed attractant formulations have biostimulatory effects on cotton plant growth. Further, the attractant formulations had a significant positive effect on the elicitation of natural plant defense and antioxidant enzyme activities, including peroxidase, polyphenol oxidase, catalase, L-phenylalanine ammonia lyase, and total phenols in cotton shoots and roots, which are known to induce biotic and abiotic stress tolerance in plants (**Table 1**).

Table 1. Effects of volatile attractants on cotton growth attributes

Plant growth attributes	% Increase over control
Shoot length	27-32
Root length	47-66
Root girth	30-32
Root: shoot ratio	15-24
Root surface area	88-120
Total plant length	27-41
Seedling Vigour index	31-43
Plant antioxidant/ defense enzyme activity	% Increase over control
Peroxidase	12-25
Polyphenol oxidase	58-109
Catalase	16-26
Phenylalanine ammonia lyase	20-32
Total phenol content	14-38

Such attributes have not been reported for any volatile attractants used in agriculture. Similarly, the attractant formulations had a positive effect on soil chemical and nutrient availability, indicating

Table 2. Effects of volatile attractants on soil nutrients and biological activities

Soil nutrient availability	% Increase/Decrease over control
pH	-0.26-2.46
Organic carbon	0.6-3.0
Available N	2.0-7.0
Available P	1.5-18.0
Exchangeable K	2.5-3.0
Total $CaCO_3$	-1.0-13.0
Available S	1.0-9.0
Available B	5.0-15.0
Available Zn	1.0-10.0
Available Mn	1.5-12.0
Available Fe	9.0-15.0
Available Cu	1.0-14.0
Soil biological attributes	% Increase over control
Soil basal respiration rate	0.2-11.0
Microbial biomass carbon	0.2-1.50
Glomalin	1.5-14.0
Soil dehydrogenase activity	4.0-27.0
Soil acid phosphatase activity	3.0-35.0
Soil alkaline phosphatase activity	2.0-15.0
Soil β glucosidase activity	4.0-18.0

Table 3. Economics of using bacterial-based volatile attractants in cotton production

Pest management method	Insecticides/ attractant cost/ha	Required sprays/ha	Manpower cost/ha	Total pest management cost/ha
Conventional method (Use of insecticides)	Rs. 1000-2000	2-4	Rs. 600-700	Rs. 3500-11000*
ICAR-CICR-attractants (Including YST cost)	Rs. 600	1-2	Rs. 600-700	Rs. 2200-4000**

** Depending on the incidence of pests, the use of insecticides and cost may vary.*
*** Use of volatile attractants is expected to save around Rs. 1500-7000/ha*

that they had no harmful effects on soil chemical properties and nutrient dynamics (**Table 2**). Overall, the attractant formulations were eco-friendly and cost-effective, did not cause any harmful effects on cotton plants, soil nutrient status, and soil biology, and can reduce chemical usage and pest resurgence in cotton; thus, they have wider commercial application prospects in agriculture.

To manage sucking pests, cotton farmers largely depended on conventional insecticides, which cost around Rs. 3500-11000 per hectare depending on the pest incidence. The use of the ICAR-CICR volatile attractants will cost around Rs. 2000-4000 per hectare, including supplementary insecticide spray and manpower cost; thus, it can save up to Rs. 1500-7000 per hectare on insecticide usage (**Table 3**).

Apart from controlling resistance development and the resurgence of sucking pests, the use of ICAR-CICR volatile attractant formulations is expected to reduce environmental pollution through the reduction of insecticidal sprays, which may result in a reduction in cultivation cost, enhancement of farm income, and enhancement in soil health and crop productivity. Reduction in insecticide usage will enhance the population of natural enemies in cotton fields, aiding in biological control. Overall, the use of the ICAR-CICR volatile attractants is expected to reduce cultivation costs, enhance environmental health, improve farmer livelihoods, and increase farm incomes, apart from acting as a monitoring tool for sucking pest incidence in cotton. Furthermore, there is great scope and potential for extending the use of the ICAR-CICR volatile attractants for managing pest infestation in other agricultural crops, and thus has wider commercial application and business potential prospects in agriculture.

The synthetic volatile chemicals used for the development of ICAR-CICR volatile attractant formulations find place in our daily routine life and include products such as food, food additives, food preservatives, perfumes, cosmetics, toiletries, medicines, insecticides, repellents, etc.). Further, the concentration of the ICAR-CICR volatile attractant formulations optimized for field use was 5 ppm, which was far below the recommended levels for the above-mentioned products available in the market. Thus, the formulation does not have any biosafety or hazard effects on humans or the environment.

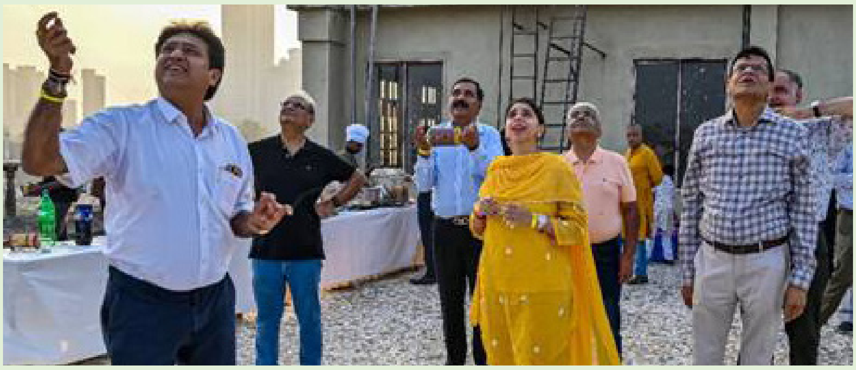
For this invention, ICAR-CICR has been granted 4 patents (Whitefly- 541777; Aphids- 553413; Thrips- 554409; and Beneficial Insects- 546146). The technology proposals for these attractants have been submitted to Agrinnovate India Ltd. for commercialisation.

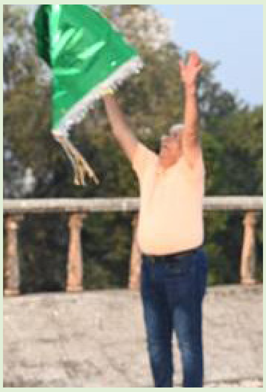
(The views expressed in this column are of the author and not that of Cotton Association of India)

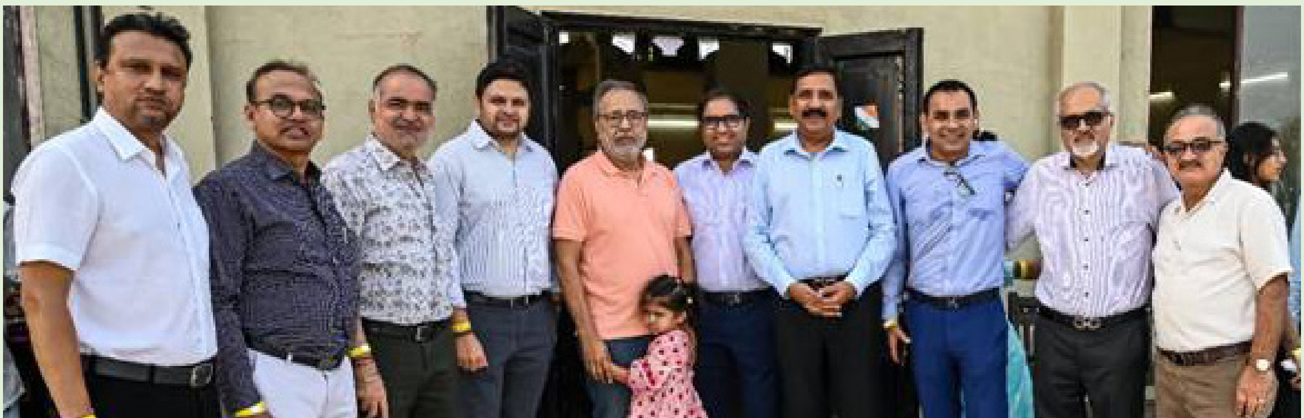
Kites Fly High Over CAI



To celebrate Makar Sankranti, many members of the cotton fraternity including CAI President Shri. Atul S. Ganatra, gathered at the Association on January 14, 2025. Young and old had fun flying kites, with the seniors easily beating the youngsters with their kite flying prowess! This was followed by high tea. Here are a few glimpses of the colourful event.





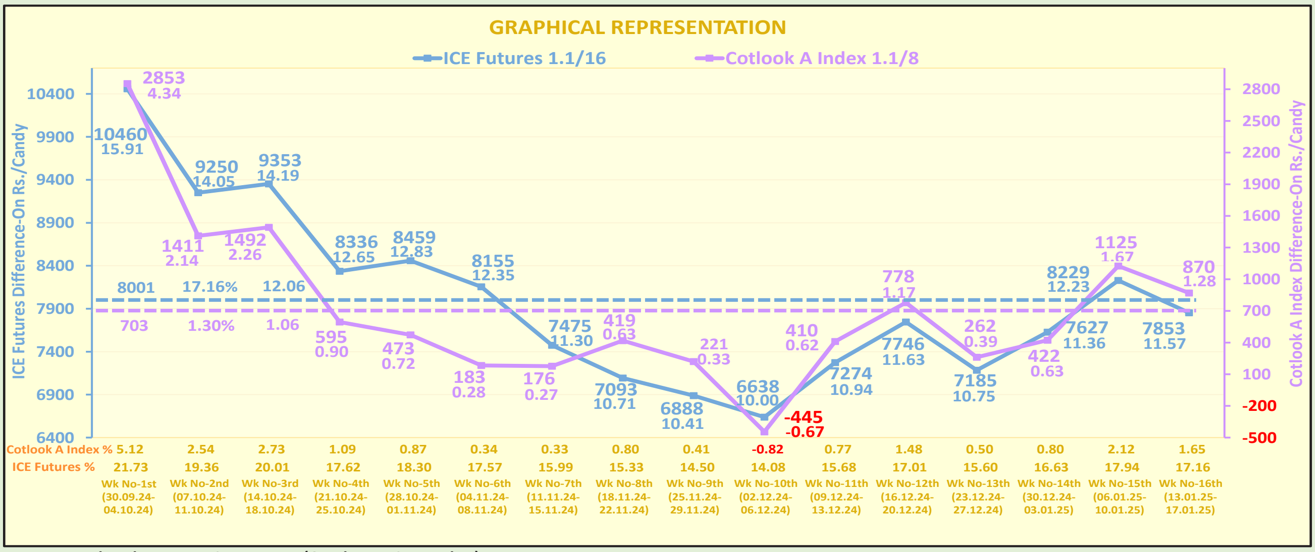


Basis Comparison of ICS 105 with ICE Futures and Cotlook A Index - 18th January 2025

SEASON 2024-2025

Comparison M/M(P) ICS-105, Grade Fine, Staple 29mm, Mic. 3.7-4.5, Trash 3.5%, Str./GPT 28 with ICE Futures & Cotlook A Index

Date 2024	1 US $ = Rs.	CAI Rates Rs./c.	Indian Ctn in USc/lb.	ICE Settlement Futures 1.1/16 Mar.'24 USc/lb.	Difference- ON/OFF ICE Futures		%	Cotlook A Index M-1.1/8	Difference- ON/OFF Cotlook A Index		%
					USc/lb.	Rs./c			USc/lb.	Rs./c	
A	B	C	D	E	F	G	H	I	J	K	L
Cotton Year Week No-16th											
13th Jan	86.58	53800	79.26	67.64	11.62	7888	17.18	77.45	1.81	1229	2.34
14th Jan	86.64	53700	79.06	67.50	11.56	7852	17.13	78.00	1.06	720	1.36
15th Jan	86.36	53700	79.31	67.77	11.54	7813	17.03	77.85	1.46	989	1.88
16th Jan	86.55	53500	78.84	66.73	12.11	8217	18.15	78.15	0.69	468	0.88
17th Jan	86.61	53400	78.64	67.60	11.04	7496	16.33	77.25	1.39	944	1.80
Weekly Avg.	**86.55**	**53620**	**79.02**	**67.45**	**11.57**	**7853**	**17.16**	**77.74**	**1.28**	**870**	**1.65**
Cotton Year Week No-15th(6th Jan 2025-10th Jan 2025)											
Weekly Avg.	**85.85**	**54120**	**80.41**	**68.19**	**12.23**	**8229**	**17.94**	**78.74**	**1.67**	**1125**	**2.12**
Cotton Year Week No-14th(30th Dec 2024-3rd Jan 2025)											
Weekly Avg.	**85.67**	**53500**	**79.66**	**68.30**	**11.36**	**7627**	**16.63**	**79.03**	**0.63**	**422**	**0.80**
Cotton Year Week No-13th(23rd Dec 2024-27th Dec 2024)											
Weekly Avg.	**85.27**	**53260**	**79.67**	**68.92**	**10.75**	**7185**	**15.60**	**79.28**	**0.39**	**262**	**0.50**
Cotton Year Week No-12th(16th Dec 2024-20th Dec 2024)											
Weekly Avg.	**84.96**	**53280**	**79.99**	**68.36**	**11.63**	**7746**	**17.01**	**78.82**	**1.17**	**778**	**1.48**
Cotton Year Week No-11th(9th Dec 2024-13th Dec 2024)											
Weekly Avg.	**84.82**	**53680**	**80.73**	**69.79**	**10.94**	**7274**	**15.68**	**80.11**	**0.62**	**410**	**0.77**
Cotton Year Week No-10th(2nd Dec 2024-6th Dec 2024)											
Weekly Avg.	**84.71**	**53820**	**81.04**	**71.04**	**10.00**	**6638**	**14.08**	**81.71**	**-0.67**	**-445**	**-0.82**
Cotton Year Week No-09th (25th Nov 2024-29th Nov 2024)											
Weekly Avg.	**84.41**	**54380**	**82.17**	**71.77**	**10.41**	**6888**	**14.50**	**81.84**	**0.33**	**221**	**0.41**
Cotton Year Week No-08th (18th Nov 2024-22nd Nov 2024)											
Weekly Avg.	**84.44**	**53400**	**80.66**	**69.95**	**10.71**	**7093**	**15.33**	**80.03**	**0.63**	**419**	**0.80**
Cotton Year Week No-07th (11th Nov 2024-15th Nov 2024)											
Weekly Avg.	**84.40**	**54300**	**82.07**	**70.77**	**11.30**	**7475**	**15.99**	**81.80**	**0.27**	**176**	**0.33**
Cotton Year Week No-06th (04th Nov 2024-08th Nov 2024)											
Weekly Avg.	**84.24**	**54600**	**82.67**	**70.32 Dec.'24**	**12.35**	**8155**	**17.57**	**82.39**	**0.28**	**183**	**0.34**
Cotton Year Week No-05th (28th Oct 2024-01st Nov 2024)											
Weekly Avg.	**84.08**	**54680**	**82.95**	**70.12 Dec.'24**	**12.83**	**8459**	**18.30**	**82.23**	**0.72**	**473**	**0.87**
Cotton Year Week No-04th (21st Oct 2024-25th Oct 2024)											
Weekly Avg.	**84.07**	**55660**	**84.44**	**71.80 Dec.'24**	**12.65**	**8336**	**17.62**	**83.54**	**0.90**	**595**	**1.09**
Cotton Year Week No-03rd (14th Oct 2024-18th Oct 2024)											
Weekly Avg.	**84.06**	**56100**	**85.12**	**70.93 Dec.'24**	**14.19**	**9353**	**20.01**	**82.86**	**2.26**	**1492**	**2.73**
Cotton Year Week No-02nd (7th Oct 2024-11th Oct 2024)											
Weekly Avg.	**83.98**	**57040**	**86.63**	**72.58 Dec.'24**	**14.05**	**9250**	**19.36**	**84.49**	**2.14**	**1411**	**2.54**
Cotton Year Week No-01st (30th Sep 2024-04th Oct 2024)											
Weekly Avg.	**83.86**	**58600**	**89.13**	**73.22 Dec.'24**	**15.91**	**10460**	**21.73**	**84.79**	**4.34**	**2853**	**5.12**
Total Avg.	**84.71**	**54628**	**82.27**	**70.22**	**12.06**	**8001**	**17.16**	**81.21**	**1.06**	**703**	**1.30**



Note:- Weeks taken as per Cotton Year (October To September).

UPCOUNTRY SPOT RATES

(Rs./Qtl)

Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Gravimetric Trash	Strength /GPT	13th	14th	15th	16th	17th	18th
Standard Descriptions with Basic Grade & Staple in Millimeters based on Upper Half Mean Length As per CAI By-laws								Spot Rate (Upcountry) 2023-24 Crop January 2025					
3	GUJ	ICS-102	Fine	22mm	4.0 – 6.0	13%	20	11726 (41700)	11698 (41600)	11698 (41600)	11698 (41600)	11698 (41600)	11698 (41600)
4	KAR	ICS-103	Fine	22mm	4.5 – 6.0	6%	21	12092 (43000)	12063 (42900)	12063 (42900)	12063 (42900)	12063 (42900)	12063 (42900)
10	M/M(P)/ SA/TL	ICS-105	Fine	27mm	3.5 – 4.9	3.5%	26	14341 (51000)	14285 (50800)	14285 (50800)	14229 (50600)	14229 (50600)	- -
								Spot Rate (Upcountry) 2024-25 Crop					
1	P/H/R	ICS-101	Fine	Below 22mm	5.0 – 7.0	4%	15	14482 (51500)	14454 (51400)	14454 (51400)	14454 (51400)	14482 (51500)	14482 (51500)
2	P/H/R (SG)	ICS-201	Fine	Below 22mm	5.0 – 7.0	4.5%	15	14650 (52100)	14622 (52000)	14622 (52000)	14622 (52000)	14650 (52100)	14650 (52100)
5	M/M (P)	ICS-104	Fine	23mm	4.5 – 7.0	4%	22	14313 (50900)	14313 (50900)	14341 (51000)	14341 (51000)	14341 (51000)	14341 (51000)
6	P/H/R (U) (SG)	ICS-202	Fine	27mm	3.5 – 4.9	4.5%	26	14791 (52600)	14791 (52600)	14819 (52700)	14819 (52700)	14819 (52700)	14819 (52700)
7	M/M(P)/ SA/TL	ICS-105	Fine	26mm	3.0 – 3.4	4%	25	- -	- -	- -	- -	- -	- -
8	P/H/R(U)	ICS-105	Fine	27mm	3.5 – 4.9	4%	26	14932 (53100)	14932 (53100)	14960 (53200)	14960 (53200)	14988 (53300)	14988 (53300)
9	M/M(P)/ SA/TL/G	ICS-105	Fine	27mm	3.0 – 3.4	4%	25	- -	- -	- -	- -	- -	- -
11	P/H/R(U)	ICS-105	Fine	28mm	3.5 – 4.9	4%	27	15044 (53500)	15044 (53500)	15072 (53600)	15072 (53600)	15072 (53600)	15072 (53600)
12	M/M(P)	ICS-105	Fine	28mm	3.7 – 4.5	3.5%	27	14847 (52800)	14819 (52700)	14819 (52700)	14763 (52500)	14735 (52400)	14735 (52400)
13	SA/TL/K	ICS-105	Fine	28mm	3.7 – 4.5	3.5%	27	14791 (52600)	14763 (52500)	14763 (52500)	14707 (52300)	14679 (52200)	14679 (52200)
14	GUJ	ICS-105	Fine	28mm	3.7 – 4.5	3%	27	14932 (53100)	14875 (52900)	14875 (52900)	14875 (52900)	14847 (52800)	14847 (52800)
15	R(L)	ICS-105	Fine	29mm	3.7 – 4.5	3.5%	28	15129 (53800)	15129 (53800)	15129 (53800)	15129 (53800)	15129 (53800)	15129 (53800)
16	M/M(P)	ICS-105	Fine	29mm	3.7 – 4.5	3.5%	28	15129 (53800)	15100 (53700)	15100 (53700)	15044 (53500)	15016 (53400)	15016 (53400)
17	SA/TL/K	ICS-105	Fine	29mm	3.7 – 4.5	3%	28	15072 (53600)	15044 (53500)	15044 (53500)	14988 (53300)	14960 (53200)	15016 (53400)
18	GUJ	ICS-105	Fine	29mm	3.7 – 4.5	3%	28	15213 (54100)	15157 (53900)	15157 (53900)	15157 (53900)	15129 (53800)	15129 (53800)
19	M/M(P)	ICS-105	Fine	30mm	3.7 – 4.5	3%	29	15297 (54400)	15269 (54300)	15269 (54300)	15213 (54100)	15185 (54000)	15185 (54000)
20	SA/TL/K/O	ICS-105	Fine	30mm	3.7 – 4.5	3%	29	15297 (54400)	15269 (54300)	15269 (54300)	15213 (54100)	15185 (54000)	15185 (54000)
21	M/M(P)	ICS-105	Fine	31mm	3.7 – 4.5	3%	30	15578 (55400)	15550 (55300)	15550 (55300)	15522 (55200)	15466 (55000)	15466 (55000)
22	SA/TL/ K / TN/O	ICS-105	Fine	31mm	3.7 – 4.5	3%	30	15578 (55400)	15550 (55300)	15550 (55300)	15522 (55200)	15466 (55000)	15466 (55000)
23	SA/TL/K/ TN/O	ICS-106	Fine	32mm	3.5 – 4.2	3%	31	- -	- -	- -	- -	- -	- -
24	M/M(P)	ICS-107	Fine	34mm	2.8 - 3.7	4%	33	21231 (75500)	21231 (75500)	21512 (76500)	21512 (76500)	21371 (76000)	21371 (76000)
25	K/TN	ICS-107	Fine	34mm	2.8 - 3.7	3.5%	34	23058 (82000)	23058 (82000)	23058 (82000)	23058 (82000)	22777 (81000)	22777 (81000)
26	M/M(P)	ICS-107	Fine	35mm	2.8 - 3.7	4%	35	21568 (76700)	21568 (76700)	21849 (77700)	21934 (78000)	21793 (77500)	21793 (77500)
27	K/TN	ICS-107	Fine	35mm	2.8 - 3.7	3.5%	35	23621 (84000)	23621 (84000)	23621 (84000)	23621 (84000)	23480 (83500)	23480 (83500)

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