
Project Coordinator's Report: 2016-17

Introduction:

Golden Jubilee celebration by the All India Coordinated Research Project on Cotton (AICRP on Cotton), formerly known as All India Coordinated Cotton Improvement Project (AICCIP), is a historic moment. This coordinated project has been one of the pioneers in the field of agricultural research in the country, especially for cotton. It is a matter of great satisfaction for Indian Council of Agricultural Research (ICAR) that during the last 50 years, the project has developed a number of cotton varieties and hybrids that have contributed to the economic well-being of not only cotton farmers but also the associated industries of India. The success achieved by the AICRP on Cotton is due to the dedication and hard work of scientists and other technical personnel since 1967.

Over the years, AICRP on Cotton has made significant achievements and contribution in the discipline of Plant breeding, Agronomical practices, Plant protection and Plant physiology. AICRP on Cotton has focused on formulating innovative methodologies and technical programmes to develop improved cotton varieties and economically viable agronomical practices along with eco-friendly and cost effective plant protection strategies for increasing cotton productivity of the country. AICRP on Cotton has developed more than 350 improved cotton varieties/hybrids since its inception.

The variety MCU 5 belonging to the superior long staple group released in 1968 in Tamil Nadu made breakthrough in improved fiber quality and recorded high yields combined with wide adaptability and spread to other states like Andhra Pradesh Karnataka and Maharashtra. Significant breakthrough in quality was achieved with the release of the variety Sujata in 1969, capable of being spun to 100s count; and subsequently, the release of Suvin in 1974, extra-long staple group capable of being spun to 120s count and considered as one of the best quality cottons in the world. Both Sujata and Suvin were developed at CICR, Regional station, Coimbatore. Another breakthrough in Indian cotton scenario was achieved in 1970, with the release of Hybrid 4 – the first commercial cotton hybrid by Gujarat. Soon after, the first inter-specific hybrid Varalaxmi, capable of being spun to 80s count, was released from Dharwad, Karnataka. An outstanding achievement is the release of the first *desi* cotton hybrid G. Cot DH 7 from Surat in 1985. This has been followed by another *desi* cotton hybrid DDH 2 from Dharwad. The variety LRA 5166 released in 1982 by CICR, Regional station, Coimbatore made remarkable achievement in large scale adoption in south and central zones and this variety ruled in many cotton growing states for more than two decades.

The AICRP on Cotton scientists, have taken up the enormous task of maintaining the purity of released superior cotton varieties and parental lines of hybrids and ensured the production of quality breeder seeds. Implementation of PPV Legislation, 2001 and DUS testing of Cotton since 2008-09 has been meticulously carried out and maintaining 1124 reference collection besides receiving PPV & FRA registration certificate for 44 varieties so far. Over the years, various agro-techniques like optimum time of sowing, seed rate, spacing, plant population, cropping system,



intercropping, nutritional management and optimum irrigation scheduling were developed for different agro-climatic zones of the country.

Though the research on cotton improvement in the country was initiated in 17th and 18th century, the systematic cotton research in India was started in 1921 through cotton research schemes sponsored by Indian Central Cotton Committee (ICCC). The ICAR launched the All India Coordinated Research Project on Cotton (AICRP on Cotton) in the year 1967 with its Headquarters at Coimbatore (Tamil Nadu). The achievements have been due to well-coordinated efforts of AICRP scientists, officers and supporting staff with strong network and active involvement of 21 participating centers from 17 State Agricultural Universities across the cotton growing states. The ICAR-Central Institute for Cotton Research (ICAR-CICR), Nagpur and its Regional Stations at Coimbatore and Sirsa provide basic research support. The ICAR-Central Institute for Research on Cotton Technology (ICAR-CIRCOT), Mumbai and its regional units are closely associated with AICRP on Cotton in evaluating the fibre quality parameters of cotton genotypes under trial. With strong support from ICAR, SAU and other private institutions, the project will continue to play an increasingly important role in the advancement of cotton research in the country.

In commemoration of the Golden Jubilee Year of AICRP on Cotton, a Brain storming sessions was organized at CICR, Regional station, Coimbatore on 9th and 10th November, 2016. The sessions covered wide range of topics including Achievements, present status and road map for future of AICRP on Cotton; Cotton Biotechnology: Issues & Tasks Ahead; New Molecules and Chemistries – an array for plant protection and Production; and Finalization of the Road map for Cotton R& D. The Plenary session was addressed by Dr Trilochan Mohapatra, Hon'ble DG, ICAR and other eminent cotton scientists and representatives from private R&D.

Indian Cotton Scenario:

It is worth mentioning that, India is the leading country in terms of area under cotton cultivation and raw cotton production in the world. As per CAB estimate, cotton production in India during 2016-17 is expected to produce 351 lakh bales of 170 kg from 105 lakh hectare with a productivity of 568kg lint/ha (CAB as on 24:10:2016). According to USDA estimate, during the last ten years from 2007-08 to 2016-17, the average total domestic raw cotton consumption was 275 lakh bales of 170 kg and the average export during the period was 80 lakh bales of 170 kg. During the current year, Gujarat, Maharashtra and Telangana were the major cotton growing states covering around 70% (74.5 lakh hectare) in area and 67% (232 lakh bales) of cotton production in India.

An area of around 11.96 lakh ha (Haryana-4.98, Punjab-2.56 & Rajasthan 4.42) was sown under cotton during 2016-17 in North zone. Though 25% reduction in area under cotton has been in Punjab during the current year compared to last year, the cotton production increased to 30% with productivity enhancement of 59%. In Haryana also, the area under cotton decreased 17% compared to last year, but the production increased to 42 % with productivity enhancement of 62%. Over all, the 14% area reduction observed in North Zone compared to last year led to production enhancement of 31%, as against the productivity increased from 459 kg/ha in 2015-16 to 668 kg/ha in 2016-17 in North Zone.

In Central Zone, just 4% area reduction was observed while production enhancement of 10% was noticed. The productivity increased from 448 kg/ha in 2015-16 to 512 kg/ha in 2016-17 in



Central India. Significant reduction in area under cotton in Gujarat estimated to the tune of 3.19 lakh ha (12%) compared to last year. Notable cotton production and productivity increase was seen in Maharashtra. There was an increase of 14 lakh bales (20%) in Maharashtra this year compared to last year. The all-time record of 398 kg/ha cotton productivity and production increase in Maharashtra offset the significant reduction in cotton production in South India, especially in Telangana and Andhra Pradesh states.

There was significant reduction in area under cotton in Telangana (5.28 lakh ha) and Andhra Pradesh (2.17 lakh ha) this year compared to last year. The cotton production from these two states also faced notable reduction to the tune of 16.5 lakh bales; and the reduction of 11.5 and 5.0 lakh bales for Telangana and Andhra Pradesh, respectively. Despite the reduction in cotton area and production from Telangana and Andhra Pradesh, the cotton productivity increased notably.

Cotton Balance Sheet (in lakh bales of 170 kg)

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16p	2016-17p
Supply										
Opening Stock	47.50	35.50	71.50	40.50	45.77	40.00	40.00	33.00	66.00	43.00
Cotton Production	307.00	290.00	295.00	339.00	367.00	370.00	398.00	386.00	338.00	351.00
Imports	6.38	10.00	7.00	2.38	7.51	14.59	11.51	14.39	20.00	17.00
Total supply	360.88	335.50	373.50	381.88	420.28	424.59	449.51	433.39	424.00	411.00
Demand										
Mill consumption	195.67	190.00	219.00	221.77	223.59	251.74	268.03	278.06	272.00	275.00
Consump by SSI	22.08	20.00	23.00	24.46	22.12	23.59	25.20	26.38	27.00	28.00
Non-mill Consump	19.13	19.00	17.00	13.38	5.00	7.83	6.32	5.00	13.00	10.00
Total consumption	236.88	229.00	259.00	259.61	250.71	283.16	299.55	309.44	312.00	313.00
Export	88.50	35.00	83.00	76.50	129.57	101.43	116.96	57.72	69.00	50.00
Total demand	325.38	264.00	342.00	336.10	380.28	385.00	417.00	367.00	381.00	363.00
Closing stock	35.50	71.50	40.50	45.77	40.00	40.00	33.00	66.00	43.00	48.00

Source: CAB Estimate as on 24.10.2016, p – Provisional,

State wise cotton area (in lakh ha) from 2007-08 to 2016-17

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16p	2016-17p
Punjab	6.04	5.27	5.11	5.30	5.60	4.80	4.46	4.20	3.39	
Haryana	4.83	4.56	5.07	4.92	6.41	6.14	5.36	6.48	6.03	4.98
Rajasthan	3.69	3.02	4.44	3.35	4.70	4.50	3.93	4.87	4.48	4.42
NORTH ZONE	14.56	12.85	14.62	13.57	16.71	15.44	13.75	15.55	13.90	11.96
Gujarat	24.22	23.54	26.25	26.33	29.62	24.97	25.19	27.73	27.19	24.00
Maharashtra	31.95	31.42	35.03	39.42	41.25	41.46	41.92	41.90	38.27	38.06
Madhya Pradesh	6.30	6.25	6.11	6.50	7.06	6.08	5.14	5.47	5.47	5.99
CENTRAL ZONE	62.47	61.21	67.39	72.25	77.93	72.51	72.25	75.10	70.93	68.05
Telangana								17.13	17.78	12.50
Andhra Pradesh	11.33	13.99	14.75	18.79	18.79	24.00	23.89	8.21	6.66	4.49
Karnataka	4.03	4.08	4.55	5.45	5.54	4.85	6.62	8.75	6.33	4.64
Tamil Nadu	0.99	1.09	1.04	1.22	1.33	1.28	1.52	1.87	1.42	1.50
SOUTH ZONE	16.35	19.16	20.34	25.46	25.66	30.13	32.03	35.96	32.19	23.13
Odisha	0.50	0.58	0.54	0.74	1.02	1.19	1.24	1.27	1.25	1.36
Others	0.26	0.26	0.21	0.33	0.46	0.51	0.33	0.31	0.50	0.50
TOTAL	94.14	94.06	103.10	112.35	121.78	119.78	119.60	128.19	118.77	105.00



State wise cotton production (in lakh bales of 170 kg) from 2007-08 to 2016-17

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16p	2016-17p
Punjab	20.00	17.50	13.00	16.00	17.50	18.50	18.50	10.50	5.00	6.50
Haryana	15.00	14.00	15.25	14.00	23.00	23.00	21.00	20.00	12.00	17.00
Rajasthan	9.00	7.50	12.00	9.00	16.90	15.90	12.90	15.90	13.90	16.90
NORTH ZONE	44.00	39.00	40.25	39.00	57.40	57.40	52.40	46.40	30.90	40.40
Gujarat	110.00	90.00	98.00	103.00	118.80	89.80	120.80	108.80	90.80	91.80
Maharashtra	62.00	62.00	65.75	82.00	70.25	75.25	78.25	74.25	69.25	83.25
Madhya Pradesh	20.00	18.00	15.25	17.00	17.30	18.30	18.30	18.30	17.30	20.30
CENTRAL ZONE	192.00	170.00	179.00	202.00	206.35	183.35	217.35	201.35	177.35	195.35
Telangana								49.90	58.90	47.40
Andhra Pradesh	46.00	53.00	54.50	53.00	53.50	77.50	71.50	20.60	18.10	13.10
Karnataka	8.00	9.00	12.25	10.00	13.90	15.90	21.90	32.90	18.90	19.90
Tamilnadu	4.00	5.00	5.00	5.00	4.30	3.80	2.80	3.80	2.80	3.80
SOUTH ZONE	58.00	67.00	71.75	68.00	71.70	97.20	96.20	107.20	98.70	84.20
Odisha		1.50	1.00	2.00	3.45	3.95	3.95	2.95	2.95	2.95
Others	1.00	0.50	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
TOTAL	295.00	278.00	293.00	313.00	340.90	343.90	371.90	359.90	311.90	324.90
Loose cotton	12.00	12.00	12.00	26.10	26.10	26.10	26.10	26.10	26.10	26.10
GRAND TOTAL	307.00	290.00	305.00	339.10	367.00	370.00	398.00	386.00	338.00	351.00

Note: Production calculated based on pressed bales for the respective states; p – Provisional,

State wise cotton Productivity (kg/ha) from 2007-08 to 2016-17

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16p	2016-17p
Punjab	563	565	432	593	607	744	800	526	376	598
Haryana	528	522	511	587	690	719	761	603	423	683
Rajasthan	415	422	459	513	651	642	605	593	569	692
NORTH ZONE	514	516	468	571	651	704	729	579	459	668
Gujarat	772	650	635	686	700	633	837	687	588	673
Maharashtra	330	335	319	378	313	332	341	324	333	398
Madhya Pradesh	540	490	424	463	433	531	628	563	559	596
CENTRAL ZONE	522	472	452	498	471	452	534	476	448	512
Telangana								501	569	653
Andhra Pradesh	690	644	628	538	543	595	555	549	613	719
Karnataka	337	375	458	346	460	596	590	661	537	769
Tamilnadu	687	780	817	1003	831	797	559	545	599	680
SOUTH ZONE	603	594	600	519	540	604	561	553	573	691
Odisha		440	315	471	583	571	548	401	408	375
India	554	524	503	513	512	525	565	511	484	568

Note: Productivity calculated including pressed cotton and loose cotton of the respective states; p – Provisional,
Source: Cotton Advisory Board as on 24:10:2016



World Cotton Scenario

Commercially cotton is grown in 77 countries and 123 countries are involved in the cotton related activities. Thirty eight countries are the major producers and also the consuming countries, while 30 Countries are major raw cotton exporters and 25 Countries exclusively import cotton. The world cotton production is estimated at 105.72 million bales of 480 lb in 2016-17 (USDA, March 2017), around 9.3% more than last year. It is also indicated that area under cotton declined to the tune of 1.28 million ha (4.18%) as compared to 2015-16. The estimate of USDA indicates that India continued to be the leading producer of raw cotton followed by China and the United States. India also maintains the largest area under cotton in the world and second largest exporter of cotton next to the United States. India also sustained the position of being the second largest consumer of cotton and is expected to consume 23.75 million bales in 2016-17.

A significant increase in area under cotton in the United States and Australia was observed, whereas the area under cotton in India declined by 11.76% (14 lakh ha) compared to last year. The production is also promising and likely increase by 34% and 58% in the United States and Australia, respectively, due to increase in the area under cotton. The cotton productivity in Brazil, Pakistan, China, United States and India are expected to increase as against reduction of over 200 kg lint/ha in Australia. Brazil productivity is likely to increase from 1345 to 1522 kg/ha; Pakistan from 544 to 699 kg/ha; China from 1570 to 1719 kg/ha; United States from 859 to 974 kg/ha and in India from 483 to 560 kg/ha.

World cotton situation in major cotton producing countries: 2016-17

Country	Area Harvested	Production	Import	Export	Domestic Consumption	Ending Stocks	Yield
Australia	550	4,500	0	4,100	-115	2,448	1,781
Brazil	930	6,500	200	2,800	3,050	7,009	1,522
Burkina	700	1,300	0	1,150	15	435	404
China	2,850	22,500	4,500	50	36,250	48,898	1,719
Egypt	55	175	525	120	590	169	693
India	10,500	27,000	2,200	4,500	23,750	11,894	560
Mali	670	1,200	0	1,075	25	486	390
Pakistan	2,400	7,700	2,600	150	10,225	2,540	699
Turkmenistan	545	1,325	0	800	650	704	529
United States	3,853	17,230	10	13,200	3,340	4,500	974
Uzbekistan	1,180	3,550	0	1,700	1,550	1,248	655
World	29,223	1,05,719	35,957	35,949	1,12,336	90,482	788

Note: Due to loss in domestic consumption, Australia domestic consumption figure in negative;

Area in 1000 ha; yields in kg/ha and quantity in million bales of 480 lb.

Source: United States Department of Agriculture as on 18th March 2016.

China continued to be the largest consumer of raw cotton (36.25 million bales of 480 lb) in the world and closely followed by India at around 23.75 million bales of 480 lb. The United States was the leading exporter of raw cotton this year with export of 13.20 million bales of 480 lb. while India stood second with annual export of 4.50 million bales of 480 lb. closely followed by Australia 4.10 million bales of 480 lb.



Notification of Cotton varieties and hybrids

Nineteen cotton cultivars / hybrids have been notified for various agro-climatic zones as detailed below.

Name	Species	Notification	Year	Center/ State variety Release	Institution
RHC 0717 (Phule Yamuna)	<i>G. hirsutum</i>	S.O. 112 (E)	2016	Central	MPKV, Rahuri
SVHH 139	<i>H x H</i>	S.O. 112 (E)	2016	Central	Shaktivardak Seeds, Hisar
F 2164	<i>G. hirsutum</i>	S.O. 2238 (E)	2016	Central	PAU, Faridkot
RHCb 011 (PhuleRukmai)	<i>G. barbadense</i>	S.O. 2238 (E)	2016	Central	MPKV, Rahuri
RHB 0711 (PhuleDhara)	<i>H x B</i>	S.O. 2238 (E)	2016	Central	MPKV, Rahuri
RHH 0707 (PhuleTarang)	<i>H x H</i>	S.O. 2238 (E)	2016	Central	MPKV, Rahuri
NDLH 1938 (Sri Rama)	<i>G. hirsutum</i>	S.O. 2238 (E)	2016	Central	ANGRAU, Nandyal
MR 786	<i>G. hirsutum</i>	S.O. 2238 (E)	2016	Central	M.R. Seeds
CO 14	<i>G. hirsutum</i>	S.O. 2238 (E)	2016	State	TNAU, Coimbatore
F 2383	<i>G. hirsutum</i>	S.O. 3540 (E)	2016	State	PAU, Faridkot
G Cot 20 (GSHV 97/59)	<i>G. hirsutum</i>	S.O. 3540 (E)	2016	State	NAU Surat
DHB 915	<i>H x B</i>	S.O. 3540 (E)	2016	State	UAS, Dharwad
SVPR 5 (TSH 0250)	<i>G. hirsutum</i>	S.O. 3540 (E)	2016	Central	TNAU, Srivilliputtur
F 2228	<i>G. hirsutum</i>	S.O. 3540 (E)	2016	State	PAU, Faridkot
Cotton Hybrid SVPR 1 (TSHH 0629)	<i>H x H</i>	S.O. 3540 (E)	2016	Central	TNAU, Srivilliputtur
RAHH 455 (Raichur Shakthi 455)	<i>H x H</i>	S.O. 3540 (E)	2016	Central	UAS, Raichur
JLA 505	<i>G. arboreum</i>	S.O. 3540 (E)	2016	Central	MPKV, Jalgaon
GN COT 25	<i>G. herbaceum</i>	S.O. 3540 (E)	2016	State	NAU, Surat
GN COT 22	<i>G. hirsutum</i>	S.O. 3540 (E)	2016	State	NAU, Surat

Breeder Seed Production

As quality seed availability is a key component in enhancing productivity of any crop, an effective maintenance of Nucleus and Breeder seed programme was undertaken by the concerned participating centres of AICRP on Cotton. The Breeder seed production, as per the Department of Agriculture, Cooperation and Farmers Welfare indent for the year 2016-17, was taken up at different centres of AICRP on Cotton and at ICAR-CICR, Regional Station, Coimbatore. The production was 102 quintals as against allocation of BSP-I of 24 quintals.



Breeder Seed Production during 2016-17 - Parental lines of Cotton Hybrids (in quintal)

S. No.	Hybrid/Variety	Produced by	Year of Notification	Allocation BSP-I	Production	Surplus or Deficit
Variety						
1.	AKA-5 (AKH-605)	Akola	1983	1.00	1.40	0.40
2.	AKA-7 (AKA 8307)	Akola	2001	1.00	1.65	0.65
3.	AKA-8	Akola	2008	0.75	1.25	0.50
4.	AKH-081	Akola	1988	0.25	0.75	0.50
5.	F-1054	Faridkot	1993	0.35	2.95	2.60
6.	F-1378	Faridkot	1997	1.15	7.00	5.85
7.	F1861	Faridkot	2004	1.05	4.30	3.25
8.	F-2164	Faridkot	2016	0.10	0.45	0.35
9.	F-2228	Faridkot	2016	2.20	13.80	11.60
10.	F-505	Faridkot	1987	0.55	2.65	2.10
11.	F-846	Faridkot	1993	0.75	2.75	2.00
12.	FDK 124	Faridkot	2011	0.10	19.60	19.50
13.	H-1098	Hisar	1997	1.25	9.00	7.75
14.	HD 432	Hisar	2010	0.35	10.00	9.65
15.	HD-123	Hisar	2000	2.55	8.00	5.45
16.	LH2076	Ludhiana	2010	0.10	1.32	1.22
17.	NH-452	Nanded	1996	0.06	0.06	0.00
18.	NH-545	Nanded	2004	0.06	0.06	0.00
19.	NH-615	Nanded	2009	0.25	0.50	0.25
20.	Phule LJA-794	Jalgaon	2005	0.50	0.84	0.34
21.	PST-9	Sriganganagar	1992	1.40	1.50	0.10
22.	RG-542	Sriganganagar	2013	2.20	4.00	1.80
23.	RG-8	Sriganganagar	1988	4.60	5.00	0.40
24.	RS-2013	Sriganganagar	2002	0.35	0.70	0.35
25.	RS-810	Sriganganagar	2001	0.45	0.00	-0.45
26.	Suraj(CCH 510-4)	CICR, Cbe	2008	0.10	0.50	0.40
		Total (Varieties)		23.47	100.03	76.56
Hybrids						
1	AAH-1 (DCH-1) (F)	Hisar	1999	0.12	0.10	-0.02
2	AAH-1 (DCH-1) (M)	Hisar	1999	0.06	0.30	0.24
3	CICR-2 FEMALE	CICR, Sirsa	2005	0.14	0.30	0.16
4	CICR-2 MALE	CICR, Sirsa	2005	0.08	0.30	0.22
5	HYBRID-12 (76 HI-20)	Surat	2006	0.02	0.50	0.48
6	HYBRID-12 (H-16)	Surat	2006	0.03	0.20	0.17
7	HYBRID-4 (G COT-76)	Surat	1974	0.03	0.60	0.57
8	HYBRID-4 (K-NECTORLESS)	Surat	1974	0.02	0.20	0.18
9	NHH-44 (AC-738)(M)	Nanded	1985	0.06	0.06	0.00
10	NHH-44 (BN-1)(F)	Nanded	1985	0.03	0.03	0.00
		Total (Hybrids)		0.59	2.59	2.00
		Grand Total		24.06	102.62	78.56



Weekly Advisory for Cotton Cultivation

Under the directives of the Director, CICR, Nagpur and active participation from scientists of AICRP on Cotton and ICAR-CICR, 26 weekly advisories were issued to cotton farmers in nine regional languages. The advisory included sowing recommendation, agronomical interventions, nutrient management, irrigation scheduling, pest and disease management. The advisories were uploaded at ICAR-CICR website (www.cicr.org.in/weekly_advisory.htm). Periodical monitoring of pest and disease was carried out by AICRP scientists across centres and timely advisories have been issued especially for whitefly and CLCuD. Pink bollworm damage and surviving larvae on Bollgard-II hybrids have been recorded from different regions in Gujarat, Andhra Pradesh, Telangana, Maharashtra and Karnataka. Immediate monitoring and management measures were recommended in the CICR advisory to prevent any further damage.

Implementation of PVP legislation, 2001 and DUS testing of cotton under ICAR-SAU system

This programme was undertaken with an objective to establish and maintain database on extant cotton varieties, conduct DUS test of New candidate, Varieties of common knowledge, Farmers varieties and essentially derived varieties, maintenance breeding of reference cotton varieties, morphological characterization of extant cotton varieties and also Registration of extant cotton varieties under this Act. This programme is implemented by ICAR-Central Institute for Cotton Research, Regional Station, Coimbatore as the nodal center and the participating centers being ICAR-Central Institute for Cotton Research, Nagpur; National Seeds project Unit, UAS, Dharwad; Department of Cotton CCSHAU, Hisar; Regional Research Station Bhatinda, PAU; Department of Cotton, MPKV, Rahuri.

The data base on extant cotton varieties has been updated from time to time. Seed multiplication, characterization and maintenance breeding of 109 extant cotton varieties were carried out. Reference varieties for conduct of DUS test in tetraploid and diploid cotton are maintained 66 in *G. hirsutum*, 38 in *G. arboreum* and 5 in *G. herbaceum*.

The above trials were conducted as per the protocol of test guidelines for tetraploid and diploid cottons. Hypocotyl pigmentation was recorded before 20 DAS at seedling stage. In the vegetative phase, leaf characteristics such as colour, hairiness, appearance, gossypol glands, nectaries, petiole pigmentation, and shapes were recorded. During the flowering stage, characteristics such as stem hairiness, stem pigmentation, plant height, growth habit, Bract type, time of flowering, petal colour, petal spot, stigma, anther filament colouration, pollen colour, male sterility, boll bearing habit, boll colour and shape, boll surface and prominence of tip, boll opening, boll weight were recorded. Sample bolls and fiber samples have been collected in all the plots. Seed characteristics such as seed fuzz, fuzz color, seed index and ginning per cent were recorded. The fiber properties viz., fibre color, length, strength, fineness, uniformity, maturity were measured using the High Volume Instrument at CIRCOT unit of Coimbatore.

Monitoring of DUS trials was conducted under the chairmanship of Dr.R.K.Chowdhury, Ex-Project Coordinator, NSP (Crops) with the Nodal officer, Co-nodal officers and representatives of seed companies on 7.9.16 at RRS Bhatinda, 6.9.16 at CCSHAU, Hisar, 21.11.16 at CICR, Nagpur, 23.11.16 at MPKV Rahuri and 30.11.16 at UAS, Dharwad.



Front Line Demonstrations (FLD) under NFSM-Commercial Crops

Front Line Demonstrations in Cotton have been conducted by the ICAR- All India Coordinated Research Project on Cotton since 1996-97. All the networking centers of ICAR- AICRP on cotton, main and regional stations of ICAR- Central Institute for Cotton Research are actively involved in this proven approach of Transfer of Technology in cotton. The objectives of the program are to demonstrate the usefulness of the latest improved crop production and protection technologies to the farmers, reducing the time gap between technology generation and its adoption, enabling the scientists to obtain direct feedback from cotton farmers and suitably reorient their research programmes to develop appropriate technology packages and creating effective linkage among scientists, extension personnel and farmers. Until 2013, the FLDs were conducted under Technology Mission on Cotton, Mini Mission II. From 2014-15 onwards, National Food Security Mission (NFSM- Commercial Crops) as been funding the demonstrations.

During the year 2016-17, under NFSM - Commercial Crops, 275 FLDs on Integrated Crop Management (ICM) on cotton, 225 FLDs on Desi / ELS cotton / ELS cotton seed production and 95 FLDs on intercropping with cotton were conducted by fifteen centers of All India Coordinated Research Project on Cotton with a budget outlay of 43.90 lakh rupees.

Frontline demonstrations conducted under NFSM-FLD through AICRP in Cotton during 2016-17

S. No	Centres	FLDs on ICM		FLDs on Desi / ELS cotton / ELS cotton seed production		FLDs on Intercropping in cotton	
		A	C	A	C	A	C
1	PAU, Faridkot	20	20	20	20	-	-
2	CCSHAU, Hisar	-	-	55	55	-	-
3	CICR, Sirsa	55	55	40	40	-	-
4	SKRAU, Sriganganagar	10	-	10	20	-	-
5	NAU, Surat	20	20	20	20	20	20
6	JAU, Junagadh	10	10	-	-	10	10
7	JNKV, Khandwa*	10	-	-	-	10*	-
8	PDKV, Akola	20	20	-	-	15	15
9	MAU, Nanded	20	20	20	20	20	15
10	MPKV, Rahuri	10	10	20	-	10	-
11	CICR Nagpur	10	10	10	10	10	10
12	UAS, Dharwad	20	20	20	20	10	10
13	UAS, Raichur	20	20	-	-	-	-
14	UAS, Chamrajnagar	20	20	-	-	5	5
15	TNAU, Coimbatore	10	10	10	10	10	10
16	CICR, Coimbatore	10	40	10	10**	10	-
Grand Total		265	275	235	225	130	95

Note: A – No. of FLDs allotted in hectare; C – No. of FLDs conducted actually in hectares;

* not conducted ; ** Conducted under Summer Irrigated Condition



Tribal Sub-Plan

Under the program of Tribal Sub Plan (TSP), a sum of 14.00 lakh rupees was utilised to conduct training programmes, demonstrations and other extension programs to disseminate the cotton production technologies exclusively to the tribal cotton farmers for improving their livelihood status.

The centre wise budget utilized for TSP during 2016-17 by ICAR- AICRP on Cotton

S.No	Centres	BudgetAllotted for TSP (Lakh Rs)
1	MAU, Nanded	4.0
2	TNAU, Srivilliputhur	1.0
3	NAU, Surat	5.0
4	TNAU, Coimbatore	1.0
5	CICR, (RS) Coimbatore	3.0
		14.0

Financial statement of AICRP on Cotton for the year 2016-17 (in lakh Rupees)

S.No	Name of the Centre	Pay	Contg	TA	Total	TSP
1	GUNTUR	160.63	9.00	2.25	171.88	0.00
2	NANDYAL	52.75	1.50	0.75	55.00	0.00
3	KANPUR	49.50	1.00	0.50	51.00	0.00
4	HISAR	34.75	3.50	1.75	40.00	0.00
5	KHANDWA	45.50	3.00	1.50	50.00	0.00
6	INDORE	38.50	1.00	0.50	40.00	0.00
7	JUNAGADH	17.00	2.00	1.00	20.00	0.00
8	NANDED	82.00	2.00	1.00	85.00	4.00
9	RAHURI	72.00	2.00	1.00	75.00	0.00
10	PUNE	19.25	0.50	0.25	20.00	0.00
11	BANSWARA	17.00	2.00	1.00	20.00	0.00
12	SURAT	84.00	4.00	2.00	90.00	5.00
13	BHAWANIPATNA	47.00	2.00	1.00	50.00	0.00
14	AKOLA	95.50	3.00	1.50	100.00	0.00
15	FARIDKOT	100.00	7.50	2.50	110.00	0.00
16	BHATINDA	55.00	3.50	1.50	60.00	0.00
17	RAICHUR	52.75	1.50	0.75	55.00	0.00
18	SRIGANGANAGAR	76.25	2.50	1.25	80.00	0.00
19	COIMBATORE	117.00	2.00	1.00	120.00	1.00
20	SRIVILLIPUTUR	62.00	2.00	1.00	65.00	1.00
21	DHARWAR	175.00	6.50	2.25	183.75	0.00
22	BANGALORE	-	-	-	-	-
24	Sub Total	1453.38	62.00	26.25	1541.63	-
25	PC Cell	-	36.00	25.75	61.75	3.00
26	TSP	-	14.00	-	14.00	14.00
27	Grand Total	1453.38	112.00	52.00	1617.38	



Monitoring Committee report of AICRP on Cotton Trials

With the approval from the Competent authority, four teams were constituted for monitoring of AICRP on Cotton trials during the year 2016-17. Suggestions/recommendations made by the team shall be discussed during the Annual Group Meeting for necessary follow-up action.

AICRP on Cotton Monitoring Committee for the year 2016-17

Zone/States	Breeder	Agronomist	Entomologist	Pathologist
North Zone (Punjab, Haryana & Rajasthan - Sriganaga Nagar)	Dr. (Mrs). P. Amala Balu, Professor, Dept of Cotton, TNAU, Coimbatore	Dr. (Mrs).S. Bharathi, Senior Scientist (Agronomy), RARS, A.N.G.R.A.U, Lam, Guntur	Dr (Mrs) B Dharajothi, Principal Investigator (Entomology) CICR, RS Coimbatore	Dr. (Mrs) B. Sree lakshmi, Principal Scientist (Plant Patho), RARS, A.N.G.R.A.U, Lam, Guntur,
Central Zone (Maharashtra & Bhavanipatna) Committee- I	Dr. S. Manickam, Principal Investigator (Plant Breeding), ICAR-CICR, Coimbatore	Dr. R. A. Meena, Principal Scientist ICAR-CICR, Sirsa	Dr. K. K. Dahiya, Assoc. Professor, CCSHAU, Hisar	Dr. J. Beniwal, Assoc. Professor, CCSHAU, Hisar
Central Zone (Gujarat, Banswara of Rajasthan, Madhya Pradesh) Committee- II	Dr Rajesh Patil Professor, UAS, Dharwad	Dr.K.Sankaranarayanan, Principal Investigator (Agronomy) CICR, RS Coimbatore	Dr S. S. Udikeri Professor, UAS, Dharwad	Dr K.B. Pawar, Junior Pathologist, MPKV, Pune
South Zone (Andhra Pradesh, Karnataka & Tamil Nadu)	Dr S.K. Verma, Principal Scientist, CICR, Regional Station, Sirsa	Dr Sudeep Mallick, Asst Professor, RRS, Bhatinda (PAU)	Dr Satnam Singh, Assistant Entomologist AICRP, RRS, Faridkot (PAU).	Dr DilipMonga, Principal Investigator (Pathology) Head, CICR, RS, Sirsa, Chairman

North Zone Monitoring Report 2016

Breeding, Agronomy, Physiology, Biochemistry, Entomology and Pathology - Report

Monitoring team for monitoring the trials under AICRP Cotton in North zone centres namely Hisar, Sirsa, (Haryana) Faridkot, Bathinda(Punjab) and Sriganaganagar (Rajasthan) was constituted and visited from 14.9.2016 to 17.9.2016. The team comprised of members Dr. (Mrs). P. Amala Balu, Professor, Dept of Cotton, TNAU, Coimbatore , (Mrs) B. Sreelakshmi, Principal Scientist (Plant Pathology), RARS, A.N.G.R.A.U, Lam, Guntur, Dr.(Mrs).S. Bharathi, Senior Scientist (Agronomy), RARS, A.N.G.R.A.U, Lam, Guntur and monitored. All the trials of Crop Improvement, Crop Production and Crop Protection were conducted as per the technical programme and there was no deviation observed in the trials in all the centres. Visited Br 05 and Br 25 trials conducted by M/s Shakthi Vardhak Hybrid Seeds Pvt.Ltd.



Breeding Report:

- In Chaudhary Charan Singh Haryana Agricultural University, Hisar, overall performance of the crop was good. However in Sriganaganagar, most of the entries were highly susceptible to CLCuD and only few entries were found to be tolerant to white fly. In Faridkot only few entries were found to be tolerant to white fly.

Agronomy Report:

- In CCS HAU, Hisar (Haryana) the crop stand was normal and the trial laid out according to the protocol. No visual treatment effect of different levels of fertilisers was observed in Agron 1A, Agron 1B and compact cultures under HDPS. Lodging of plants was observed due to rainfall coupled with heavy winds in the month of August. Regarding the Physiology trials Phy 1A and Phy 1 B some entries were not received in time due to which delayed sowing was done. The growth of the entries that were sown late (28.5.16) was less compared to normal sowing date (7.5.16). Delayed sowings resulted in stunted plant growth in the trials. In Phy 2 among the three dates of sowing taken up 5.5.16 sowing date visually appears to be promising.
- In Sirsa multi location trial of Bt varieties under HDPS, the entry 201 was having bigger boll size with one to two node sympodial bearing. Earlyness was observed in 201,213,219 and 220 entries. All the entries were affected with leaf curl virus.
- In Sriganaganagar, no visual treatment effect of different levels of fertilisers was observed in the trials. In physiology the paid up trials Phy 3 and Phy 4 no visual differences regarding the treatments.
- In Faridkot (Punjab), in Agro 1b trials Flusian Z20, Elo and saferock testing no visual treatment effect of different levels was observed. In the sub soiling experiment clear difference in growth with sub soiling in comparison to control was there. In Agro 1b recommended spacing appears to be good. In the trials Flusian Z20, Elo and saferock testing no visual treatment effect of different levels was observed. In the sub soiling experiment clear difference in growth with sub soiling in comparison to control was there.
- In Bhatinda (Punjab), in Agro 1b recommended spacing appears to be good. In the trials Flusian Z20, Elo and saferock testing no visual treatment effect of different levels was observed. In the sub soiling experiment clear difference in growth with sub soiling in comparison to control was there.

Entomology Report:

- All the trials were conducted as per the technical programme and there was no deviation observed in the trials in all the centres. In Hisar, whitefly infestation was low in the trials. It was suggested to record critical observations on the infestation of bollworms in the trial Ent 5a and Ent 5b. The crop growth was healthy, however, lodging was observed due to rainfall coupled with heavy winds in the month of August.
- In Sriganaganagar, Whitefly infestation was observed in the trial plots and low to medium level of infestation of spotted bollworm was also observed.
- In Ent 4 trial, intensive survey was conducted in farmers' fields by all the centres and weekly pest status was reported regularly which was sent to the Council for information and to CICR, Nagpur for the publication in the weekly advisory.



Pathology Report:

- In Hisar, the *arboreum* entries were free from whitefly and CLCuD, however lodging was observed due to rainfall coupled with heavy winds in the month of August. Delayed sowings resulted in stunted plant growth in the trials. High incidence of CLCuD was observed in Bt cotton hybrids.
- In Sirsa, the crop was healthy and moderate incidence of CLCuD was observed in the entries. Delayed sowings resulted in stunted plant growth in the trials. Screening nurseries for CLCuD and root rot were excellent.
- In Faridkot, the crop growth was good. Delayed sowings resulted in stunted plant growth in the trials. Incidence of *Alternaria* leaf spot and bacterial blight was observed in some entries.
- In Bhatinda, the plant stand was good and severity of CLCuD was less in the trials.

Central Zone Monitoring Reports**Maharashtra & Odisha**

The team comprised of Dr. S. Manickam, Principal Investigator (Plant Breeding), ICAR-CICR, Coimbatore as the Chairman with Dr. R. A. Meena, ICAR-CICR, Sirsa (Agronomy), Dr. K. K. Dahiya, CCSHAU, Hisar (Entomology) and Dr. J. Beniwal, CCSHAU, Hisar (Pathology) as the members. They visited OUAT, Bhawanipatna, ICAR-CICR, Nagpur, PDKV, Akola, CRS, Nanded, MPKV, Rahuri, MPKV, Pune centre, M/S. Mahyco at Jalna, and M/s. Ajeet Seeds at Gangapur,

The breeding, agronomy and entomology trials were monitored at OUAT, Bhawanipatna on 03-10-2016. The crop was in boll formation stage. All the trials were conducted as per the technical programme and the field sanitation was good. Data were recorded as per technical programme. There was no deviation observed in the trials.

The team visited the Breeding and Agronomy trials conducted at ICAR-CICR, Nagpur on 04-10-2016. Both the trials were conducted as per protocol and the crop was in boll formation stage. Field sanitation was good and because of good and well distributed rainfall, the yield levels are expected to be high. However, in HDPS trials, excessive vegetative growth was noted.

The trial at PDKV, Akola was monitored on 05-10-2016. All the trials were conducted as per the approved technical programme and there was no deviation. Even though excessive rainfall was received, the yield levels are expected to be high.

At CRS, Nanded, the trials were monitored by the team on 06-10-2016. The trials in breeding, agronomy and entomology were conducted as per the technical programme. The crop was in boll formation stage and field sanitation was good. In this station also, excessive and distributed rainfall was received and the yield levels are expected to be high in rainfed trials. Later, the team visited Parbhani station, where the breeding trials belonging to desi cotton were conducted. The crop was good and field sanitation was good. On 07-10-2016, the team visited and monitored the Br-05b trial conducted by M/S. Mahyco at Jalna. The crop growth was acceptable and the trial was conducted as per the protocol. Few entries showed male sterility.



The team visited and monitored the rainfed trial Br-05b conducted by M/s. Ajeet Seeds at Gangapur on 08-10-2016. The trial was conducted as per the approved technical programme without any deviation. The trial location received excessive and distributed rainfall and hence the yield levels are expected to be higher.

The trials belonging to Breeding, Agronomy, Entomology and Pathology were monitored at MPKV, Rahuri on 09-10-2016. All the trials were conducted as per the technical programme except the Bt variety trial and the HDPS trial with desi cotton, wherein proper check hybrids were not included as per programme. Hence, corrective measures were suggested. In *G. barbadense* trial, some entries showed poor germination and hence the plant stand was poor. The crop was in boll formation and bursting stage.

On 09-10-2016, MPKV, Pune centre was visited and monitored by the team. The desi cotton genotypes (75 entries) were sown on 15.6.2016 to screen against Fusarium wilt. Of these, 13 genotypes which were found moderately resistant in Seedling Resistance Test (SRT) were transplanted in field for Adult Plant Resistance Test (APRT) on 23.8.2016. Proper field screening protocol was followed for screening.

Agronomy Report: Akola (R), Nanded (R), Rahuri (I) and Bhwanipatna (R)

- Agronomy-IA: Agronomic requirements of promising pre-release/ recently released *hirsutum*/*barbadense*/*arboreum* genotypes/ hybrids of Cotton: The experiment at the centers Akola (R), Nanded (R), Rahuri (I) and Bhwanipatna (R) were sown with different cultivars using the spacing and fertilizer application as per protocol. The crop was well protected and the crop performance was satisfactory. The data are being recorded as per technical programme.
- Agro-IB: Evaluation of compact culture under HDPS with different nutrient levels; The experiment at the centers Rahuri (I), Akola, Bhwanipatna and Nanded were sown with different HDPS cultivars using the reduced spacing. The fertilizer application was as per protocol. The crop was well protected and the crop performance was satisfactory. The data are being recorded as per technical programme.
- Agronomy-II: Developing suitable agronomy for ruling Bt. Hybrid of the region: The experiment at the centers Akola (R), Nanded and Rahuri (I) using different Bt hybrids were sown with the proposed treatments. The spacing and fertilizer application was as per protocol. The crop was well protected and the crop performance was satisfactory. The data are being recorded as per technical programme.
- Agronomy-V: Technology for organic Cotton: The experiment at the centers Nanded (R), Rahuri (I) and Bhwanipatna (R) using different cultivars were sown with 11+1 treatment as per protocol. The crop was well protected and the crop performance was satisfactory. The data are being recorded as per technical programme.
- Agronomy-VII: Evaluation of Bt (*hirsutum*) genotypes under HDPS cultivation: The experiment at the centers Bhawanipatana, Nanded, Akola and Rahuri sown at reduced spacing 75 X 10cm sown as per protocol. At all the centers, 20+1 different HDPS genotypes being evaluated except Bhawanipatana where 17+1 genotypes included in the study. The fertilizer application was as per protocol. The crop was well protected and the crop performance was satisfactory.
- Agronomy-VIII: Evaluation of desi (*arboreum*) genotypes under HDPS cultivation: The experiment at the centers Bhawanipatana, Nanded, Akola, Rahuri were sown at reduced



spacing 60 X 10 cm with check at recommended spacing. The fertilizer application was as per protocol. The crop was well protected and the crop performance was satisfactory. The data are being recorded as per technical programme.

- Agronomy-XI: Effect of liquid bio stimulant on cotton growth and production (SEA 6): The experiment at the centers Nanded was under taken with 3 treatments using Ajeet 155 BG II as per protocol. The crop was well protected and the crop performance was satisfactory.
- Agronomy-X (4): Efficacy testing of super absorbent (UPDT): The experiment at the centers Nanded and Akola were sown using different Bt hybrids with 12 treatment as per protocol. The crop was well protected and the crop performance was satisfactory.
- Agronomy-IV: Moisture conservation techniques for enhancing cotton productivity under drip irrigation: The experiment at the center Akola was sown with treatments T1- Polymulch on ridge and furrow with drip T2- Bio multu (crop residue) on BBF with drip T3: Poly mulch on BBF with drip T4: Dust mulch on flat bed with drip T5: No mulch on flat bed with drip T 6: Conventional irrigation (Ridge&furrow T7: Rain fed Bt cotton (Ridge&furrow) as per protocol. The crop was well protected and the crop performance was satisfactory. The data are being recorded as per technical programme.

Pathology Report

PDKV Akola

- All the Plant Pathology trials i.e. Path.1 (a); Path. 1(b); Path. 1(c); Path. 1(d) and Path. 2 (a) were conducted as per technical programme.
- At farmers' field, Bacterial leaf blight, *Myrothecium* leaf spot and *Alternaria* leaf spot diseases did not appear. In research farm, the bacterial blight intensity varied from 0.3 to 1.0 per cent. *Alternaria* leaf spot disease was observed below 0.5 per cent, whereas, *myrothecium* leaf spot was in traces.
- In path.1 (b) weekly observation on incidence and progress of Bacterial leaf blight and Grey mildew diseases were observed in LRA 5166, RCH-2 and AKA-8 under natural conditions. Bacterial blight appeared in 32nd met. week which increased upto 1.0 and 2.0 per cent disease index in 35th std. met. week in RCH-2 and LRA 5166, respectively. Grey mildew disease did not appear.
- Path. 1 (c): Weekly observations were carried out to study the variability of *Alternaria* leaf spot and meager infection of the disease was observed till date.
- Path.1 (d): All the varieties and Bt hybrids were found free from TSV in survey of farmer's field during July, August and September, 2016.
- Path.2 (a): Low disease pressure of bacterial blight and *Myrothecium* leaf spot was observed in screening of Bro3 (b) 6201-6208; Bro 4 (b) 6211-6218; Bro 5(b) 6221-6230; Bro 6 (b) 6241-6244 Br 24 (b) 6251-6261 and Br 25 (b) 6271-6275 trials.
- Path 2(b): The intensity of bacterial leaf blight disease was found below 0.8 per cent in confirmation and maintenance of disease resistance lines.
- Path.3 (c): For the management of cotton diseases, experiment was executed as per technical programme and observations on major and minor diseases are in progress.
- Crop stand, crop growth and field sanitation were good.



CRS Nanded

- All the AICCIP plant pathology trials i.e. Path. 1(a); Path 1 (b); Path.1 (c); Path. 1 (d); Path. 2(a), Path 2(b) and Path. 2 (c) were carried out as per technical programme.
- In Path. 2(a) Observations on the occurrence of various diseases were recorded on farmer's field. Low incidence of bacterial leaf blight, wilt and root rot diseases were observed.
- To correlate the disease progress in relation to weather factors, observations on *Alternaria* leaf spot, Bacterial leaf blight Grey mildew, wilt and parawilt diseases were recorded at weekly interval in Rasi-Bt. II, LRA-5166 and PA-225.
- To study the variability of *Alternaria* leaf spot, a susceptible cotton variety LRA 5166 was sown in pots (5 plants per pot) with three replications and weekly observations were recorded. Disease did not appear till date.
- During survey, all the varieties/Bt cotton hybrids were found free from TSV at farmers' field.
- In experiment Path 2(a) screening of breeding lines for disease resistance. Bro 3(CZ), Br 04 (b) CZ and Br 05 (b) trials were sown in 3.6 meters row length with spacing of 90x60 cm in two replications. LRA 5166 was sown as susceptible check and incidence of *Alternaria* leaf spot, Bacterial leaf blight and grey mildew were recorded.
- In Path 2(b) un-replicated trial with 26 entries was conducted for confirmation and maintenance of disease resistant lines.
- Path 3(c) for the management of cotton disease, an experiment was conducted as per technical programme and observations on diseases are in progress.
- Crop stand, crop growth and field sanitation were good.

MPKV Rahuri

- All the AICCIP plant pathology trials i.e. Path. 1 (a); Path 1(b); Path. 1 (d); Path 2(a); and Path 2(b) were conducted as per technical programme. Observations on the occurrence of diseases in farmer's field and on research farm were carried out.
- At farmer's field, *Alternaria* leaf spot intensity was upto 10-15 per cent, whereas, *Myrothecium* leaf spot and bacterial leaf blight diseases were observed in traces.
- Path. 1(b): Disease progress of *Alternaria* leaf spot disease was observed in un-replicated trial of 36.0 x 14.40 m². The disease appeared in 32nd std. met. week.
- Path.1 (d): Tobacco streak virus (TSV) was observed on non Bt/Bt.hybrids in research farm and farmer's field. The TSV incidence was 10-15 per cent in Bt cotton hybrids on farmer's field.
- One hundred and five entries under National trials Br 02 (a) 601-642; Br 06 (a) 701-719; Br 12 (a) 801-807; Br 15 (a) 811-818 and sixty entries in central zone trials Br 03 (a) 6101-6109; Br 04 (a) 5111-5116; Br 05 (a) 6131-6146; Br 06(a) 6151-6161; Br 13 (a) 6171-6175; Br 14 (a) 6181-6186; Br 15 (a) 6191-6197 were screened for disease resistance. One row of susceptible check LRA 5166 was sown as border row and after every fourth test entry. *Alternaria* leaf spot was observed upto 2.0 grade disease severity, whereas, TSV disease was upto 3.0 grade.
- To study the confirmation and maintenance of *Alternaria* leaf blight (ALB) disease resistant lines, 23 entries (Central zone: 10 and National trial: 13) were sown in pots. Two pots per



entry with 3 plants in each pot were maintained. The *Alternaria* leaf blight disease to the tune of 0-2 grade was observed.

- Over the entire crop stand, crop growth and field sanitation were good.

COA Pune:

- To screen diploid cotton genotypes against *fusarium* wilt, 75 entries were sown on 15.6.2016. 13 genotypes found moderately resistant in Seedling Resistance Test (SRT) were transplanted in field for Adult Plant Resistance Test (APRT) on 23-8-2016. One row of 17.0 m per entry with the spacing of 100 x 60 cm was maintained.

Summary

- All the AICCIP plant pathology trials were conducted as per technical programme at all the locations.
- Crop stand, crop growth and field sanitation were good.
- During survey at farmer's field and research farm low incidence of Bacterial leaf blight, *Alternaria* leaf spot and *Myrothecium* leaf spot diseases were observed at all the locations.
- MPKV Rahuri centre observed 10-15 per cent TSV incidence at farmers field. All the varieties/Bt hybrids were found free from TSV at farmers field during survey conducted by Akola and Nanded centre.
- In the studies on variability of *Alternaria* leaf spot at CRS Nanded, disease did not appear, whereas, meager infection of the disease was observed at PDKV Akola.
- As per protocol, breeding lines of National and Zonal trials were evaluated against foliar diseases at the AICRP centres. Susceptible check for important diseases was maintained around the experiment and after every fourth test row. Bacterial leaf blight and *Alternaria* leaf spot diseases were recorded upto 2.0 grade disease severity at PDKV Akola and MPKV Rahuri, respectively. Grey mildew did not appear.
- The confirmation and maintenance of *Alternaria* leaf blight (ALB) disease resistant lines in the trial was conducted at PDKV, Akola, CRS, Nanded and MPKV Rahuri. During evaluation of different resistant lines, ALB disease severity varied 0-2 grade at all the centres.
- For the management of cotton disease, the experiment was executed as per technical programme and observations on diseases are in progress at PDKV Akola and CRS Nanded.
- At COA Pune to screen diploid cotton genotypes against *fusarium* wilt, 75 entries were sown on 15.6.2016. Thirteen genotypes which were found moderately resistant in Seedling Resistant Test (SRT) were transplanted in field for Adult Plant Resistant Test (APRT) on 23.8.2016.

Monitoring Team report of Gujarat, Madhya Pradesh & Rajasthan (Banswara)

The team that consisted of Chairman: Dr.K.Sankaranarayanan, Principal Scientist, CICR, CBE, Members: Dr Rajesh Patil (Plant Breeding), Dr S.S.Udikeri Principal Scientist (Entomology), and Dr K.B. Pawar, Junior Pathologist visited from 17.10.16 to 23.10.16.

Plant Breeding Report:

At Surat, there were ten trials, which were well conducted as per protocol and the crop was in a healthy condition. Satisfactory boll load was seen in all trials. At Junagadh, there were six trials.



Moderate growth was observed with *hirsutum* varietal and desi trials. The hybrid trial showed better plant growth and expression. The sucking pest incidence was quite high and damage was evident mostly in the *hirsutum* varietal trials. At Banswara, all trials were conducted as per protocol and the crop management was good. The following entries 806 of 12aNT at Surat, 6138 of 5a and, 6255 of 24b at Junagarh, 639 of 2A trial and 667 and 669 of 2b of Banswara were observed to be poor in plant population

Agronomy Report:

- In Surat, ten agronomic, three physiology trials along with other trials were monitored. The crop was at boll development stage. The field sanitation was maintained and the trial was good and acceptable. In Junagarh, the trials are laid out as per the protocol and acceptable one. However, sickness was observed in organic cotton plot and advised to go for groundnut as rotation crop
- At Surat and Junagarh, the crop suffered with incidence of sucking pest, and care should be taken to take necessary plant protection measures to protect the crop.
- Performance of *barbadense* pre released culture GSB 43 is not up to the mark both at Surat and Junagarh
- The trials were well planned at Banswara, good and acceptable for making conclusion. However, larger plot size is advised for treatment evaluation in some experiments
- The trials were laid out as per the protocol and acceptable one at Indore. The trial is in good shape and the results are useful to make conclusion.
- At Khandwa, the trials were executed as per the technical programme. The field sanitation was maintained and the trial is good and acceptable.

Entomology Report:

The experiment conducted at Junagarh titled ENT 5b: Efficacy of combination of insecticides against insect pests: sufficient population is not maintained. Three numbers of rows per plot were followed with 14 plants /row which resulted as less than 50 %of population. Hence, it is suggested that these results of the experiment may not be considered for interpretation. Disease incidence is noticed in population dynamics/screening experiments and it needs proper measures. Banswara experiments are implemented and maintained well. The same was observed at Khandwa: The experiment titled, ENT 1 b: Plant stand is not uniform because of germination problem in all stations

Pathology Report

All the trials were conducted at Surat. The required observations were recorded and there was no any deviation from technical programme. Hence, the trials results are acceptable. The technical programme of the trials was followed and prescribed observations were collected at Junagarh and the results are considered for interpretation. The field sanitation was good and satisfactory crop growth was observed with all the trials at Khandwa at the time of monitoring. The trial was conducted as per protocol and there was no deviation from protocol. No trials for Plant Pathology were conducted at Banswara and Indore.



South Zone Monitoring Reports

Monitoring team consisted of Dr Dilip Monga, Head, CICR, RS, Sirsa, Chairman; Dr Surender Kumar, Principal Scientist (Crop improvement), CICR, Regional Station, Sirsa; Dr Sudeep Mallick, Professor of Agronomy, AICRP, RRS, Bhatinda (PAU); and Dr Satnam Singh, Assistant Entomologist AICRP, RRS, Faridkot (PAU). The team monitored trials conducted at Dharwad, Raichur, LAM-Guntur, Nandyal, Srivilliputhur, Perambalur, Coimbatore, and Chamrajnagar between 23:11:2016 and 3:12:2016

Crop Improvement Report:

- In UAS, Dharwad, the trials were as per the protocol and under Bt Cotton Variety trial under HDPS, no border row was planted. Check was having 6 rows. Good growth of the crop. Cluster bearing in entry 201 was noticed. Pink bollworm was noticed.
- In KSSC Dharwad, trials were as per protocol. Leaf reddening was observed. No irrigation was given but the trial is irrigated in both Br 15a PHT and Br 05a CHT.
- In UAS, Raichur, trials were as per protocol, Leaf reddening was observed in all the trials. Crop was in poor condition due to scanty rainfall in trials Br 22b IET and Br 34b IET .
- In Nandyal, trials were as per protocol. This year scanty rainfall was received. No border row was planted. Check was having 6 rows. Good growth of the crop. Entry 201 was late in bearing. Lot of Pink bollworm was noticed in Bt Cotton Variety trial under HDPS.
- In LAM, Guntur, the spacing may be verified from the University recommendations as varieties and hybrids are being sown at similar spacing. The trials are irrigated but dependent on rain. Here too, no border row was planted. Check was having 6 rows. Good growth of the crop. Entry 201 was late in bearing. Lot of Pink bollworm was noticed in Bt Cotton Variety trial under HDPS.
- In TNAU, Srivilliputhur, trials were as per protocol and leaf reddening was noticed in some of the entries. Presence of TSV suspected in Br 05a CHT trial. Jassid problem was noticed in Br 06a CVT trial
- In TNAU, Perambalur, the spacing may be verified from the University recommendations as varieties and hybrids are being sown at similar spacing. In general, the crop was having reduced growth reason being the non-availability of North East monsoon.
- In Coimbatore, trials were as per protocol. In general, the crop was having reduced growth reason being the non-availability of North East monsoon.
- In CICR, RS, Coimbatore, trials were as per protocol for the Bt Cotton Variety trial & Evaluation of Desi (*arboreum*) genotypes under HDPS cultivation
- In Chamrajnagar, UAS, Bengaluru, trials were not as per protocol and no border row was planted. Spacing within entries was more. The crop was under stress due to failure of North East monsoon. As the trial is irrigated, ensure sufficient water for irrigation. The trial was planted under the shade of coconut trees which affected growth of cotton crop. The spacing recommendations of UAS, Dharwad may be followed as there were no recommendations from the University. The trial Br 05a CHT is vitiated and may not be considered.

Crop Production

- In UAS, Dharwad, Sowing was done on time. Crop was suffering from moisture stress due to failure of rains during last week of October. Forced maturity and opening of bolls due to



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- moisture stress. Crop condition is satisfactory. . Under physiological study, condition of the trial was good. Due to less rain, the differences for Physiology trial 1 (with in rainfed vs. irrigated) may differ.
- In UAS, Raichur, sowing of all the agronomy trial was delayed due to late release of canal water. Agronomy 1a (iii) trial was fully infected with jassid and leaf hopper attack and replication II, III was subjected to water logging. So trial should be scrapped.
 - In Nandyal, Experiments were laid out in proper manner. Rain was not received, so the crop was in stress. Crop is in boll bursting stage. Heavy flower drop was recorded in *arboreum* and american cotton.
 - In LAM-Guntur, Crop is in boll development stage. Crop is suffering from moisture stress due to failure of rains. Experiments were laid out in proper manner. Under physiological study, condition of the trials was good. Experiment 1b pot culture was completed. In Phy II second and third sowings are not as per schedule.
 - In TNAU, Coimbatore, TNAU, Perambalur, and CICR, Coimbatore, overall condition of the all the trials were good and laid out in proper manner.
 - In Chamarajnagar, UAS, Bengaluru, overall condition of the all the trials were good. Experiment (Argon II) sown in September is in square formation stage. There is a scope of greater improvement by adopting recommended agronomic / field management package.

Plant Protection- Entomology Report: Poor germination problem observed in Ent 1 (b) Advanced screening of promising entries for development of repository for sucking pests trial in all the centres.

- UAS, Dharwad and UAS Raichur: Trials were as per protocol and observations recorded as per technical programme
- Nandyal : Trials were as per protocol and observations recorded as per technical programme and Ent 6a not conducted
- Lam Guntur: Trials were as per protocol and observations recorded as per technical programme
- TNAU, Coimbatore: Trials were as per protocol and observations recorded as per technical programme. T-5 and T-6 was not received and hence not included in the Ent 6a: Evaluation of pheromone traps and lures against Cotton Pink Boll worm (all south zone centres) through mass trapping and whitefly adult Suction Trap (Guntur) trial. No pink bollworm incidence was observed in trial till date under Ent 6 b: Evaluation of Mating Disruption Pheromone for the Pink Bollworm trial. Expt. Not done due to non-receipt of T. bactrae under Ent 7: Evaluation of egg parasitoid Trichogramma bactrae through inundative release trial.
- UAS, Bengalure, Chamrajnagar: No observations recorded under Ent. 1 (a): Screening of breeding material for resistance to insect pests trial. Only check entries were planted (no clarity about the experiment). The trial, Ent 6a: Evaluation of pheromone traps and lures against Cotton Pink Boll worm(all south zone centres) through mass trapping and whitefly adult Suction Trap(Guntur) not conducted due to deficit rainfall

Plant Protection- Pathology



- UAS, Dharwad: Trials were as per protocol and observations recorded as per technical programme. Ten *Alternaria* cultures were sent to TNAU, Coimbatore under Path.1(c): Studies on the variability of *Alternaria* leaf spot trial. RG-778 and NDLA-3094 were found resistant to *Alternaria* blight and rust under Path.2(b): Confirmation and maintenance of disease resistant lines trial. As suggested during the technical program formulation, two indigenous cultures of UASD ie., *Trichoderma viride* and *Pseudomonas fluorescence* were added as new treatments to the experiment under Path. 3 (c): Developing IDM modules for the management of cotton diseases trial.
- Guntur, and TNAU, Coimbatore: Trials were as per protocol and observations recorded as per technical programme.

Summary observations:

1. Looking at the weather scenario, in general, there was severe water stress due to very less rain fall in the later part of the season in all the three states but it was more so in Tmil Nadu with total failure of north east monsoon. So the crop has undergone stress at almost all the places.
2. There were small discrepancies in some trials at few locations which have been pointed out in the remarks column in front of each trial by the respective member of the monitoring team.
3. Pink bollworm incidence was observed in the Bt variety trials and there was more growth in long linted trial at Nandyal and Guntur.
4. At few locations, some treatments could not be taken up due to non-receipt of the material and the concerned scientist should raise such issues timely and also involve the PIs for such issues to ensure receipt of material for trials timely.
5. In Chamrajnagar center, no scientist has been posted during the season and trials in general were not as per protocols and serious deficiencies were noted. Some of the trials were even not conducted without any proper justification. There is a need to take immediate action in this regard as the trials are only being conducted by RAs.

