



Annual Report
2010-11

CICR



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केन्द्रीय कपास अनुसंधान संस्थान, नागपुर

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What does it take to enable India become world leader in cotton? With the abundant natural resources, talent and will to succeed, with some good efforts in research and development, India should be able to reach its pinnacle soon. The area at 111.6 lakh hectares in 2010 is an all time record and highest ever for any country in history. It is more than one third of the current global area. Cotton prices have been at an all time high, reaching more than Rs 6000 per quintal during March 2011. Expectations have increased and the area is likely to reach 120 lakh hectares in 2011. This year Brazil has produced a record 119 lakh bales from 10 lakh hectares. India has been able to produce 312 lakh bales from 103 lakh hectares. Among the six major cotton growing countries, Brazil (2027 kg/ha) holds highest productivity level followed by China (1311 kg/ha), USA (945 kg/ha), Uzbekistan (859 kg/ha), Pakistan (684 kg/ha) and India (478 kg/ha). The global cotton production increased significantly over the past 5 years. During 2010 a total of 25,185,000 metric tonnes (148 M bales, 170 kg/bale) were produced. The area under Bt cotton hybrids in India reached about 90% and thus the proportion of long staple cotton increased to more than 78% which was about 38% prior to 2002. India's cotton is having a perceptible impact on the global import-export scenario. India became a leading global exporter of raw cotton with exports ranging from 0.6 to 1.5 M tonnes raw cotton each year from 2005 onwards, while concomitantly, imports declined from 0.43 M tonnes to 0.09 tonnes. This year exports touched 1.1 M tons. The yields appear to have stagnated at an average of 500 kg/ha over the last 6 years starting from 2004, irrespective of the increase in area under Bt cotton hybrids. With challenges increasing constantly, ICAR is in the process of reorienting its research programmes to address the emerging challenges and this report provides an overview of the research and development activities undertaken during 2010-11.

An early maturing, medium staple variety, CNHO-12, containing high oil content was notified for the irrigated areas of central cotton zone. *G. arboreum* variety CISA 614 (CICR-2) was also notified for its cultivation in entire north zone. Six genetic stocks with novel and unique traits were registered with NBPGR. Four gene constructs AC₂, βC₁, CP and βV₄ were employed in Agrobacterium mediated transformation for CLCuV resistance using RNAi approach. Bt Adapt II, a stochastic two gene resistance prediction model was developed and validated for devising resistance management strategies for Bt cotton. A new RNA virus belonging to Luteoviridae was identified on cotton for the first time in India. Intra specific variation in the cotton leaf hopper *Amrasca devastans* based on mtDNA studies was reported for the first time. IRM strategies developed by the institute were implemented in 19 districts, covering 236 villages reaching out to 13990 cotton farmers cultivating cotton over 25476 ha. New research projects on high density planting systems for maximizing cotton productivity and basic studies on leaf reddening were initiated. An innovative programme on the isolation and identification of seed specific promoters and gossypol synthesis gene for silencing through RNAi interference was initiated. On rainfed Vertisols and vertic Inceptisols, spacings of 45×15 cm and 45×10 cm were found optimum for short, compact genotypes of *G. hirsutum* and *G. arboreum* respectively. To address the problem of labour shortage for manual weeding, a stale seed bed techniques using a mixture of pendimethalin 1.0 kg a.i./ha and glyphosate 1.0 kg/ha, one week after pre-sowing irrigation was standardized for weed management under winter irrigated tracts of South Zone.

The research achievements presented herein reflect the fruits of the untiring efforts by the entire staff of the institute. The technical support and generous financial assistance from the Indian Council of Agricultural Research and other funding agencies-DBT, DST etc., provides the necessary impetus to accelerate the R&D output. I am highly grateful to Dr. S. Ayyappan, Secretary, DARE and Director General, Dr. Swapan Kumar Dutta, Deputy Director General (Crop Sciences), Dr. K.C. Jain (former ADG, CC) and Dr. N. Gopalakrishnan, Assistant Director General (CC), ICAR, New Delhi for the guidance and support provided and also for encouraging new research initiatives. The invaluable contribution of Dr M. V. Venugopalan, Head, PME Unit, Dr Mahendra Singh Yadav and members of the editorial board are gratefully acknowledged.

K.R. Kranthi
Director

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