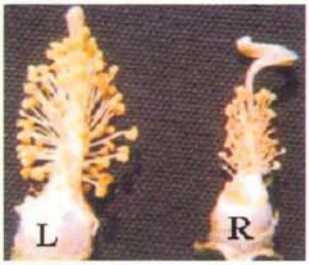








भाकृअनुप
ICAR

CENTRAL INSTITUTE FOR

COTTON

RESEARCH

ANNUAL REPORT 2009-10

CICR

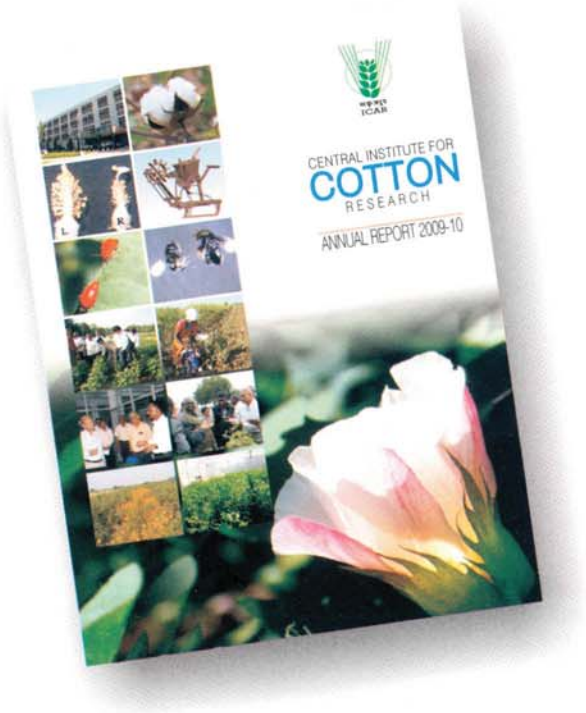
वार्षिक प्रतिवेदन

ANNUAL REPORT 2009-10

भाकृअनुप
ICAR

केन्द्रीय कपास अनुसंधान संस्थान, नागपुर

CENTRAL INSTITUTE FOR COTTON RESEARCH, NAGPUR



Published by

Dr. K. R. Kranthi
Director
Central Institute for Cotton Research
Post Bag No. 2, Shankar Nagar, PO,
Nagpur - 440010 (MS), India

Editorial Committee

Dr. K. R. Kranthi
Dr. N. Gopalakrishnan
Dr. K. N. Gururajan
Dr. M. V. Venugopalan
Dr. Sandhya Kranthi

Compilation, Collation and Production

Dr. Mahendra Singh Yadav

Assistance
Hindi Version : Dr. Ram Ratan Gupta

Correct Citation
CICR, Annual Report 2009-2010
Central Institute for Cotton Research,
Nagpur, India
PP. 100

Printed At :
Surya offset, Ramdashpeth, Nagpur

PREFACE

Cotton production in India reached a peak level of 31.5 m bales (5.35 m tonnes) from 9.5 m ha in 2007-08. Since then, the production did not increase further, despite an increase in the area under cotton to 10.1 m ha in 2009-10. Across the globe cotton production did not show any remarkable increase in the last 3 years and it remained around 24 million tonnes. Despite a steady increase in area under Bt cotton, which currently occupies more than 83% of the cotton area in India, the productivity has declined from 560 kg lint/ha in 2007-08 to 488 kg/ha in 2009-10. Amongst the several yield reducing constraints and challenges that have emerged in the recent 3-4 years, problems-erratic rainfall, supra-optimal temperatures, re-emergence of the cotton leaf curl virus in north, emergence of new insect pests such as mealybugs and miridbugs, resurgence of sucking pests, reddening of leaves, jassid resistance to insecticides, emerging bollworm resistance to Bt cotton and parawilt have been significant. Concerns over deterioration in fibre quality and shortage of short and medium staple cotton are also being expressed by the textile industry. CICR is entrusted with a huge responsibility of addressing these challenges and is committed to the cause of cotton and cotton farmers. Importantly, the most immediate challenge is to sustain the productivity gains brought about by transgenic cotton by fine tuning the production and protection technologies.

This report provides a glimpse of the research and developmental activities and the achievements under various programmes undertaken during 2009-10. The highlights include the release of the first public sector Bt variety Bikaneri Narma and the Bt hybrid Bt-NHH44, developed through a collaborative effort of NRCPB New Delhi, UAS Dharwad and commercialization facilitated through CICR Nagpur. In a new exciting development, two new genetically modified events have been developed by the institute for resistance to the cotton leaf curl virus resistance. A novel class I Chitinase gene confirming fungal disease resistance was amplified, cloned from G. hirsutum (LRA 5166) and transformed into grey mildew susceptible G. arboreum cultivars PA 255, PA 402 and RG 8. The events were found to be promising and are being intensively tested for resistance. From the conventional varietal improvement programme, two high yielding G. arboreum varieties viz., CISA 310 and CISA 614 were released for cultivation in the North zone. In addition, an early maturing, high oil yielding compact G. hirsutum variety CNHO 12 was released for the Central zone. Agronomy of NHH 44 Bt on rainfed vertisols of Central zone was standardized and 90 x 30 cm spacing was found optimum. Supplementing the recommended NPK with Zn (10 kg/ha) and B (3 kg/ha) was found necessary to sustain rainfed cotton yield on shallow (less than 50 cm) black soils. A prototype of a 2-row fertilizer applicator as an attachment to the bullock drawn blade harrow was developed. Agrotechniques to boost the productivity of ELS cotton fertigation (90:19:37 kg N:P:K) in 6 splits, alternate day drip irrigation at 0.8 Etc, soil moisture conservation through bio-degradable mulches were standardized. Lectin genes CFA from Colacasia esculenta and AMTC from Amorphophallus poeniphalus were effective against aphids and whitefly and in combination with banana lectin form a potent source of gene for the developmental of sucking pest resistant GM cotton. Artificial diets for aphids, jassids and white flies were developed. For eco-friendly (organic) pest management, Mealy Kill was found effective against mealy bugs and synthetic analogues of methyl jasmonate, ocimene and limonene were effective against jassids, aphids and mealy bugs. A talc based formulation of entomopathogen Lecanicillium leccani was developed which was effective against mealy bugs (Phenococcus solenopsis and Paracoccus marginatus). Insecticide resistance in

jassids was quantified in a networking mode for the first time. Jassids were found to exhibit 5450 fold and 2500 fold resistance to imidacloprid and thiamethaxam as compared to 57 fold resistance to conventional chemicals such as monocrotophos. IRM strategies were further disseminated in 330 villages of 11 districts in North zone, 172 villages in 11 districts of Central zone 150 villages of 10 districts in South zone and 10 villages of South 24 Pargana, district of East zone reaching out to 38,472 cotton farmers.

The research achievements 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. Mangala Rai and Dr. S. Ayyappan Secretary, DARE and Director General, Dr. S.K. Dutta, Deputy Director General (Crop Sciences) and Dr. K.C. Jain, Assistant Director General (CC), ICAR, New Delhi for the guidance and support provided and also for encouraging new research initiatives. The Annual Report (2009-10) is being presented herewith a sense of satisfaction and pride.

K. R. Kranthi
Director












CONTENTS