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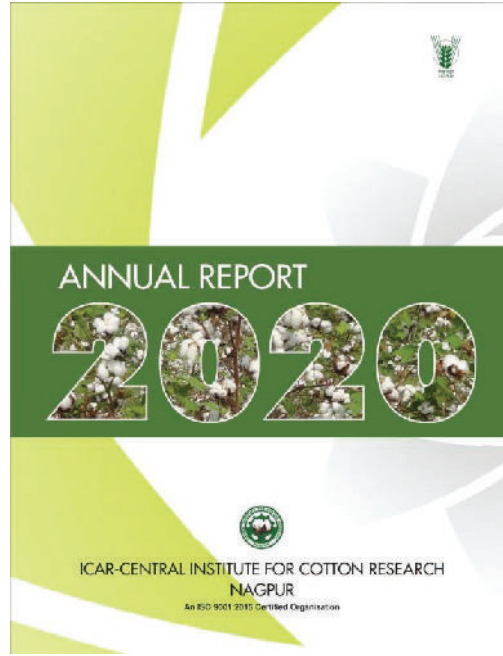
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PREFACE

Cotton was sown in 133.41 million hectares during 2020-21 season by an estimated 6 million cotton farmers across 11 major cotton growing states despite the COVID-19 pandemic which reiterates the resilience of Indian cotton production sector. The institute coped well with the unfolding pandemic situation and continued its research which led to significant achievements during the year under report.

For the first time, seven Bt cotton varieties were notified for commercial cultivation: two varieties for cultivation in the central zone (CICR SurajBt and CICR 16 Bt), three Bt varieties for cultivation under rainfed conditions in Maharashtra (CICR Rajat Bt, CICR PKV 081 Bt and GJHV 374 Bt), CICR Bt 6 for cultivation in Haryana and CICR 23 Bt for irrigated situations in South zone. CNA 1032, a *G. arboreum* genotype was identified for central zone; CCB-51 an ELS cotton genotype was released for irrigated conditions of South Zone (Andhra Pradesh, Telangana, Karnataka and Tamil Nadu) with an yield potential of 1464kg/ha, shorter duration of 165-170 days, fibre length of 37.4 mm and micronaire of 3.3 and tenacity of 38g/tex. CICR-H Cotton 36 (Suraksha), an extra-long staple hirsutum variety was identified for release for both Central and South Zone States in irrigated conditions. One *G. barbadense* line CCB-12 was identified for registration with ICAR-NBPGR for cleistogamous nature of flower as a unique trait. More than 1000 crosses were attempted exploring wild species for increasing genetic diversity and pre-breeding for specific traits. Promising derivatives of upland cotton were obtained from crosses with exotic lines (GVS 8 and GVS 9) for breeding resistance to the dreaded leaf curl virus disease (CLCuD) in the north zone.

Thirty-six and forty-two geographical populations of pink bollworm were monitored for resistance against baseline susceptibility to cry toxins, Cry1Ac and Cry2Ab, respectively. Spatial maps depicting the risk of pink bollworm establishment, number of generations and potential population abundance in different geographical locations were prepared by coupling a temperature-based phenology model with geographical information system (GIS). A multi lure pheromone system against major lepidopteran pests of cotton was designed and tested for field efficacy. Using marker assisted selection (CIR-246 marker) and artificial inoculation of BLB resistant plants, 56 BC4-F2 and 38 BC5-F1 BLB resistant plants were selected, screened and grouped. Nine potential endophytes were screened in vivo and were found promising against cotton diseases. For the first time natural infection of reniform nematode eggs by nematode antagonistic fungus, *Pochonia chlamydosporia* was reported from India and mass production protocol standardized.


Soils rotated with deep rooted crops - pigeon pea, sunnhemp and *daincha* had less penetration resistance than those without a rotation. The night Net Ecosystem Exchange (NEE) was 5-10 $\mu\text{mol m}^{-2} \text{s}^{-1}$ for cotton crop. The total Water footprint (WF)

of rainfed cotton at Nagpur was 16384 m³/t of seed cotton, of which the green WF was 12187 m³/t, and the grey water foot print was 4198 m³/t. The total WF of drip-irrigated cotton was 13310 m³/t. After two years of continuous cotton-maize and cotton-wheat cropping system under irrigated conditions, SCY increased significantly by 26.5% and 134.6% combined sources of organic (FYM once in two years) and inorganic (NPK + MgSO₄ + ZnSO₄ + Borax) treatments, respectively over control. At Sirsa, the seed cotton yield (SCY) was significantly higher under Zero tillage - permanent narrow raised bed with residue retention on surface. Among the cropping systems, significantly higher SCY was recorded under Cotton - Chickpea cropping systems.

Under e-Communication programme, cotton technologies were disseminated among farmers through voice message services covering 1.6 lakh farmers. Uploaded 91,54,264 voice messages during the year. Voice messages on cotton production and protection technologies were disseminated in Marathi, Tamil & Hindi.

During the period, a total of 76 research papers of which 30 research papers with >6 NAAS Score and 46 research papers with <6 NAAS Score as well as 30 popular articles were published. Forty-nine training programmes including virtual training programmes were organized. Linkages were fostered with sister ICAR Institutes, SAUs, other public sector Institutes, private companies, NGOs and farmer producer groups to commercialize and upscale varieties and technologies developed. One MTA and six MoUs were inked during January to December 2020

Guidance and constant encouragement received from Dr Trilochan Mohapatra, Secretary, DARE and Director General, ICAR and Dr T.R. Sharma, DDG (Crop Sciences) helped the institute perform well in tough times. I am grateful for the guidance and direction by the Research Advisory Committee Chairman Dr SA Patil and respected members of RAC. I am grateful for the support extended by Dr R.K. Singh, ADG (CC), Dr AH Prakash. Head, Regional Station, Coimbatore and Project Coordinator, Dr O.P. Tuteja, Head, Regional Station, Sirsa. Heads of Divisions viz., Dr VN Waghmare, HoD Crop Improvement and Director (Acting); Dr Blaise D'Souza, HoD, Crop Production and Dr Nandini Gokte, HoD, Crop Protection and Dr MV Venugopalan, Head, PME at CICR provided support in carrying out the research programmes. Thanks are due to the Editorial Committee members for their unstinted work in bringing out this publication in time.


(Y.G. Prasad)
Director, ICAR-CICR



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