

viruses could infect cotton. The three RNA viruses include cotton bunchy top virus, cotton leaf roll dwarf virus and the tobacco streak mosaic virus. Among the DNA viruses, cotton leaf curl virus and cotton leaf crumple virus are important and affect cotton production. The paper described viral diseases and their remedies.

ICAC Researcher of the Year 2017

The ICAC is inviting applications for the ICAC Researcher of the Year 2017. The last date to apply is March 31, 2017. The ICAC started recognizing a researcher in 2009 on an

annual basis. Researchers from universities and public sector research organizations from the ICAC members can apply for the award directly or through their heads of institutions. Researchers from all disciplines of cotton production research are eligible for the award. An independent Award Panel, consisting of five experts from at least four countries reviews applications and chooses the winner. The ICAC awards the researcher a shield, an honorarium of US\$1,000, a certificate, and the title “ICAC Cotton Researcher of the Year”. More information about the award is available at <https://www.icac.org/tech/ICAC-Researcher-of-the-Year-Award>.

The Way Forward for International Cooperation in Cotton Research

Though each issue of the *ICAC RECORDER* mentioned me as “Editor”, I have been writing most articles for the *ICAC RECORDER* since June 1991. Occasionally, and more often in the last few years, I invited researchers from various countries to contribute articles to the *RECORDER*. All such articles were published under their names. There is no article from me in the current issue of the *ICAC RECORDER*—an exception, because I spent most of the time in the last few months winding up to hand over the charge to Dr. Keshav R. Kranthi, who will replace me effective April 3, 2017. I wish him all the best to serve the world cotton research community, better than what I was capable and able to do for the community.

I was born in a farming family in a village in Pakistan. As a child, I worked at the farm in all kinds of operations involving removing weeds, cutting fodder and picking cotton. The path from the village to Washington, DC, was not straightforward. I am grateful to my grandfather for dreaming to give me an education and to my parents for realizing his dreams. It was 1975, when I was starting my Ph.D. in Tashkent, Uzbekistan, and decided to be a cotton person, would that get me a decent job or retire like a regular guy. I returned to Pakistan with a degree without knowing much about cotton. Nonetheless, I was determined to learn cotton and the research environment at my first job on cotton had perfect conditions to fulfill my aspirations to be a cotton man. My junior and senior colleagues at the Central Cotton Research Institute, Multan, played a crucial role in teaching me about cotton. Those five years followed by another five years of working at the headquarters of the Pakistan Central Cotton Committee (PCCC) prepared me well to become Head of the Technical Information Section of the ICAC. I am indebted to the PCCC for converting me from a raw Doctor of Philosophy (in Plant Breeding and Genetics) to a specialized cotton expert.

My 26 years at the ICAC, in the same position, gave me ample time not only to accomplish the mandate I was given but also to visualize and implement new ways of providing updates on

production research and facilitating communications among researchers. Let me begin with what I could not achieve. I am convinced that an international institute on cotton research must exist. I made a futile attempt to convince member governments of the ICAC to establish such an institute/center. A living example of the closure of the International Institute of Cotton in the early 1990s and governments’ unwillingness to contribute money for a ‘spending/consuming’ institute were the main hurdles to this new initiative. I proposed a center that would require only foundation money and then become self-supporting. The issue went on for years through the Consultative Group on International Agriculture Research (CGIAR) and also through the Standing Committee of the



M. Rafiq Chaudhry (1991)

ICAC, which took it to Plenary Meetings. The case was certainly strong but I must admit that my inability to convince governments is one of my most important failures at the ICAC. The appetite for the Institute still exists.

Having failed on the international institute/center, I started to explore newer means of upgrading the level of collaboration and cooperation among researchers on a constant basis. I put forward the idea of establishing an International Cotton Researchers Association (ICRA) in 2011. The World Cotton Research Conference-5 (WCRC-5), held in India in November 2011, evaluated and approved the idea. There was no pathway discussed or planned as guidelines for future proceedings, which inadvertently gave me the full liberty to structure, incorporate and get the ICRA going. I am glad that the ICRA has become established and known in the cotton research community in a short period of time. The WCRC-6 was held under the auspices of the ICRA and the Association has now almost finalized the establishment of its own Secretariat office in Pakistan. A full-fledged article on the ICRA was published in December 2016 issue of the *ICAC RECORDER*. ICRA is now seen as the international voice of cotton researchers but has a long way to go. Dr. Kranthi will have a big challenge not only to keep it up, but also expand its work and utilize it in the interest of the cotton research community.

In 1991, when I joined the ICAC team, the idea of holding a world cotton research conference was already circulating. The first such conference was held in 1994 in Australia, without any plans to hold conferences on a periodic basis. The Technical Information Section decided to hold world cotton research conferences every 4-5 years and invited Greece to host the WCRC-2 in 1998. The large participation and the success of both the WCRC-2 and the previous conference in Australia encouraged me to build upon the Conferences and make researchers proud to attend WCRCs. The Conferences became so popular that researchers competed to host the WCRC-3 and WCRC-4. Now, a host country is selected in advance and the ICRA is able to negotiate terms with the host country in due time. The WCRC-7 will be held in Izmir, Turkey in May/June 2020.

Prior to the initiation of the WCRCs, the ICAC followed the approach of regional networking to bring researchers together. In 1991, the Latin American Association for Cotton Research and Development (ALIDA) and the Interregional Cooperative Network on Cotton for the Mediterranean and Middle East Regions were already established. Two new networks have been created since 1991, the Asian Cotton Research and Development Network and the Southern and Eastern African Cotton Forum (SEACF). All networks are very active; obviously meetings of the Asian Cotton Research and Development Network (initiated in 1999) are bigger than other networks. This leaves the western and central African cotton-producing countries without a regional entity at the level of networks supported by the ICAC. The ICAC attempted more than once to establish an equivalent regional network

but was unsuccessful. At one stage, CABI, in addition to the ICAC, also offered its financial and organizational support to establish a network for the West and Central African countries. A lack of local interest always hampered these efforts. As far as the ICAC could do with limited resources, cooperation at a regional level has risen to a much higher level than before. It will be a challenge for the new Head of the Technical Information Section to interconnect the networks among themselves and more particularly with the ICRA as an umbrella organization of the cotton research community.

The Common Fund for Commodities (CFC) became operational in 1989 and the first commodity development project was approved in 1991. The ICAC received its first project from the CFC in 1992. The ICAC received 22 more projects from CFC over the years, until the CFC changed its focus from grant to loan projects. The CFC projects worth over US\$60 million not only provided additional funds for research, but also provided opportunities for researchers across countries and contents to work together on common problems. Most of the projects sponsored by the CFC were on production research. Member countries of the CFC changed the charter of the organization around 2012 and project proposals no longer need to be sponsored or supervised by International Commodity Bodies (the ICAC served as the designated ICB on cotton and textiles). As a consequence, the ICAC lost a monopoly on access to CFC funding for cotton development projects. Under this new phase of operations, the CFC has resources to make relatively small grants of up to about US\$150,000 in support of loan projects. This closed the door for cotton research projects emanating from the ICAC. This change at the CFC was a major setback to international cotton research. When, how and if any, support for sponsorship of cotton projects will become available is nowhere in the sight.

The provision of updates on production research, which was seen as the primary function of the Technical Information Section at the time of its formation in 1982, continued and improved over the years but not without significant changes, such as the facilitation of cooperation among researchers. The *ICAC RECORDER* has seen many changes over time. Since June 1991, over 250 articles have been published in the *ICAC RECORDER*. Review articles and Technical Seminars continued. One change that has happened throughout the years is that researchers started contacting the Technical Information Section with questions in search of a solution of their problems or the right source for the information they sought. This was in a way similar to the manner in which the CGIAR international centers on specific crops have projected themselves. This role of the Technical Information Section has significant room for expansion. It would be highly desirable to go beyond its current limits and facilitate the exchange of germplasm. Chances for such an expanded role have increased substantially with the establishment of ICRA.

Three other publications of the Technical Information

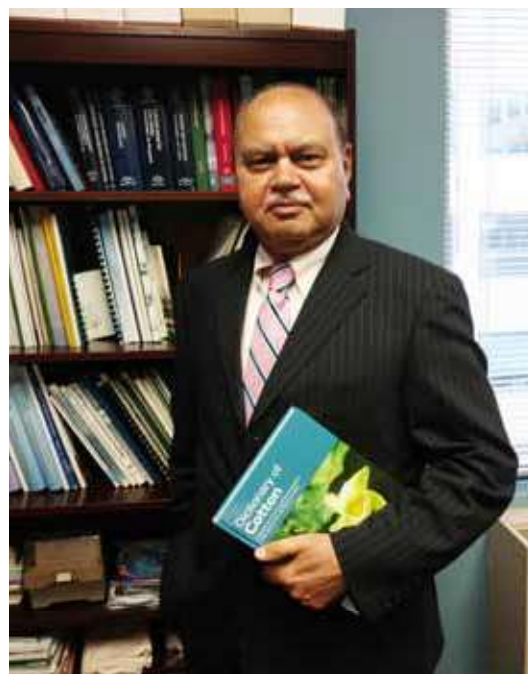
Section are released on a three-year cycle: *Cotton Production Practices*, *Structure of Cotton Research*, *Input Supply and Transfer of Technology* and *Cost of Production of Raw Cotton*. Their last issues were published in 2014, 2015 and 2016 respectively. Previous issues of these publications can be traced back to 1991 without any interruption. The World Cotton Calendar, available free in searchable form on the ICAC web page at www.icac.org, was produced using the data from the *Cotton Production Practices – 2014*. The *Structure of Cotton Research*, *Input Supply and Transfer of Technology* has changed the most in the last 26 years. The objective was to add more value to this publication. Much room for improvement still remains. The *Cost of Production of Raw Cotton* is so useful that it did not require any changes and I do not think the readers will see in changes in the future.

I do not think that I left anything significant out. Thank you for reading me for the last 26 years. With this, I pass the flag to Dr. Keshav Kranthi to continue the mission of the Technical Information Section to provide updates on production research and to facilitate communications among researchers.

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M. Rafiq Chaudhry (2017)

New Pests - New Challenges

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Abstract

With the introduction of transgenic cotton in Pakistan, farmers became comfortable with the newly found control of bollworms and increased their focus on solving the serious problem of controlling the Cotton Leaf Curl Virus (CLCV) disease. Thus, early sowing became popular. However, this practice increased the crop period, which seriously disturbed the cotton agro-ecosystem while opening the door to other threats. For instance, the number of spray applications needed to control sucking insect pests plus the early sowing of cotton adversely affected non-target and friendly organisms, giving rise to new pest problems, such as controlling the mealy bug, red cotton bug and dusky cotton bug. These pests are currently inflicting huge losses on the economy and increasing the plant protection costs accruing to farmers. Efforts are currently under way to develop better methods of chemical pest control using the most effective compounds, improve biological control with the identification of new predators and parasitoids, and mass breed known natural enemies. In the meanwhile, after about 15 years of quiescence, the pink bollworm re-emerged as a serious threat to cotton. One of the checks on the pink bollworm was based on the biotech gene

Cry1Ac. Unfortunately, a gradual decline in the efficacy of the Cry1Ac against the pink bollworm occurred, leading to a steady increase in infestations as a result of the minimal use of insecticide applications in control measures. Losses due to pink bollworm infestations wiped out an estimated US\$1.2 billion (Rs. 125 billion) in annual cotton production (in monetary terms) in 2015/16. If the pink bollworm is not managed properly and in a timely manner, it will entail a catastrophic crisis for 1.3 million cotton farmers in the country.

Introduction

Pakistan is the fourth largest producer of cotton, the third largest exporter of raw cotton, the fourth largest consumer of cotton and the largest exporter of cotton yarn in the world. Cotton is planted on about three million hectares or about 15% of the cultivated area in Pakistan. Over 1.3 million farmers of the total of five million are engaged in cotton production. Millions of other people are employed along the entire cotton value chain, from weaving to textile and garment export, and depend on this crop for subsistence. Cotton and its by-products account for 10% of the country's GDP and 60% of