

## *Curriculum Vitae*

### **Professor Dr. Abdul Qayyum Rao**

**(Winner of ICRA Asia young Innovation Gold Medal 2017 & PAS Professor Zabta Khan Shinwari Gold Medal 2022)**

**Humboldt fellow 2016-18**

CEMB, University of the Punjab, 87 West canal Bank Road Thokar Niaz Baig Lahore, Pakistan

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( <https://publons.com/researcher/2553738/abdul-qayyum-rao/>)

### **Personal Statement**

Botanist, Plant Molecular Biologist, Biotechnologist working on **Genome editing** by using state of art technology **CRISPR Cas9/Cas12 system** and **transgenic crop biotechnology** for the improvement of different traits of crop plants and crop plant protection from insects, pests, weeds, and viruses. Major emphasis of work is on crop plants cotton, which is the backbone of Pakistan economy. Cotton crop regardless of its importance faces severe problem of biotic and abiotic stresses. **Biotic stresses** account for 70% of the total losses and major among those are caused by insects 25-30%, weeds 30% and viruses 30-35%. To combat such problems local cotton varieties were genetically modified by using Bt genes for insects, EPSPS gene for weeds and RNAi technology to control CLCuV. **Almost 95-99% control of chewing insects of cotton** was attained in transgenic cotton plants and the transgenic germplasm developed is now available in the form of cotton varieties namely CEMB 33, CA 12 and CEMB 66. The first two are already approved and being utilized for the farmers now a days. Similarly, Herbicide resistant cotton developed in my group is showing almost **99% weed control after single spray of glyphosate** saving input in the form labor and plant losses occur due to invading weeds in the field conditions. I am **winner of ICRA Asia young Innovation Gold Medal of 2017** having mentioned success as reflected by my cv. Cotton leaf curl virus transmitted by the whitefly vector, *Bemisia tabaci* (Genn.), has plagued the economy of Pakistan for years and has become a nightmare for the farmers of the country. Previously RNAi approaches have been applied to control this problem but was not proved so successful. Currently **CRISPR/Cas nuclease** which is becoming a major tool to cause target-based genome to knock down. My research group has adopted this technology for control of insects and also related problem of crop plants which has become possible due to collaboration with our **German partner institute KIT** funded by **Humboldt** in the form of my research stay in Germany. Beside this, one domain of my research group is also taking into account plant based immunogenic response against different diseases of poultry like NDV and Avian Influenza etc.

### **Key Achievement**

- 1. Developed Insect and Herbicide Resistant Cotton varieties.**
- 2. Developed Edible Vaccine against NDV (Trials in Process)**
- 3. Established CRISPR Cas Genome Editing Technology at CEMB**
- 4. Supervised 44 M.Phil and Nine PhD students**
- 5. Published 109 research articles with impact factor of more than 200.**
- 6. Granted one and submitted five patents.**
- 7. Won 14 National and International grants.**
- 8. Won ICRA Young Innovation Gold Medal and Number of Technology Awards**
- 9. Won PAS Professor Zabta Khan Shinwari Gold Medal 2022**

- 10. Successfully obtained genome editing of potato vacuolar Invertase gene**
- 11. Obtained genome editing of CLCuV in Cotton**
- 12. Developed International collaborations and equipped with advanced training.**
- 13. Editor and Reviewer of International Journals**

## **Education**

**Post Doc (2016-2018)** Molecular Biology and Biochemistry Department **KIT, Germany**

**Ph.D., 2009**, Centre of Excellence in Molecular Biology CEMB, University of the Punjab:  
Molecular Biology

**M. Phil., 2002**, Center of Excellence in Molecular Biology CEMB, University of the Punjab,  
Lahore, Pakistan: Molecular Biology

**M.Sc ., 2000**, Bahuaddin Zakariya University Multan Pakistan

**B.Sc., 1998**, Bahuaddin Zakariya University Multan Pakistan

**F.Sc., 1994**, Government Islamia Degree College Khanewal (Board of Intermediate and Secondary  
Education Multan)

**Matric., 1992**, Government High School Kot Abbas Shaheed Multan (Board of Intermediate and  
Secondary Education Multan)

## **Academic and Professional Appointments**

**01/03/2021 to date: InCharge Plant Biotechnology lab & Professor** CEMB University of the  
Punjab, Lahore, Pakistan.

**27/06/2018 to 28/02/2021 InCharge Plant Biotechnology lab & Associate Professor** CEMB  
University of the Punjab, Lahore, Pakistan.

**31/08/2009 to 25/06/2018, InCharge Plant Biotechnology lab & Assistant Professor** CEMB  
University of the Punjab, Lahore, Pakistan.

**16/01/11 to 23/01/11 Visiting Scientist** on training fellowship entitled “Sequencing BY USING  
310 Genetic Analyzer GenoMed Turkey.

**01/01/2009 to 30/08/09, Post Doc fellow** (Molecular Biology), Center of Excellence in Molecular  
Biology, University of the Punjab Lahore, Pakistan.

**31/07/2007 to 30/12/2008, Research Officer** (Molecular Biology), Center of Excellence in  
Molecular Biology, University of the Punjab Lahore, Pakistan.

**08/10/2005 to 04/10/2006, Visiting Scientist** on training fellowship entitled” Development oriented Plant biotechnology and Biosafety Germany.”

**01/12/2004 to 30/05/2005, Research Fellow** (Molecular Biology), Center of Excellence in Molecular Biology, University of the Punjab Lahore, Pakistan.

### **Teaching:**

<b>Class</b>	<b>University/Department</b>	<b>Course Title</b>	<b>Credit hours</b>
M.Phil/PhD	CEMB	Molecular Biology	4 credit hours
M.Phil/PhD	CEMB	Plant Molecular Biology	4 credit hours
M.Phil/PhD	CEMB	Practical Course	2 credit hours

### **Grants/Technical Experience**

#### **Major Research Grants awarded as PI/Scientist/CO-PI**

**Project 1: PI:** Development of *Verticillium Wilt* and Abiotic stress resistant cotton A collaborative project with Azerbaijan funded by Islamic Development Bank (IDB). **USD: 150,000**

**2022-2025**

**Project 2: Team Leader/Collaborator CEMB/CO PI:** Development of climate smart cotton by editing Arginase (GhArg) genes using genome editing (CRISPR/Cas) tools. (LCF HEC)

**Rs. Million 21.50**

**2022-2024**

**CEMB PART**

**Rs. Million 3.8**

**Project 3: PI:** Development of Climate Resilient cotton resistant to drought and heat through editing of negative regulators by using Cpf1 multiplex system. (NSLP funded by PSF)

**Rs. Million 6.00**

**2023-2026**

**Project 4: Co-PI:** Regulating NAD salvage pathway in cotton for drought stress tolerance A Collaborative Project with LUMS NRPU funded by HEC. **Rs Million: 9.5**

**2022-2025**

**Project 5: Co-PI:** Enhancement of Omega-3 Fatty Acids in Maize A collaborative project with FC University NRPU funded by HEC.

**Rs Million: 3.7**

**2022-2025**

**Project 6: Co-PI:** Improvement of Alovera Cosmetic Impact on Human Skin through its genetic modification by Human Serum Albumin Gene Funded by Punjab Higher Education Commission of Pakistan (PHEC).

**Rs Million: 5.0**

**2021-2023**

**Project 7: PI:** Control of Cotton Insects through Modified Combination of Bt and Plant Lectin genes NRPU Funded by **Higher Education Commission of Pakistan (HEC)**

**Rs Million: 2.45**

**2018-2021**

**Project 8: PI International Equipment subsidy Grant:** A grant for purchase of equipment awarded by **Humboldt foundation**

**Euro: 14900**

**2018- 2019**

**Project 9: Co PI** An Alternative Approach To Combat Pink Bollworm Infestation In Cotton. NRPU Funded by **Higher Education Commission of Pakistan (HEC)**

**Rs Million: 4.59**

**2018-2021**

**Project 10: Co PI** Cas9-mediated gene engineering of the *Solanum tuberosum* VinV gene to reduce tuber sweetening during long term storage. Funded by **Higher Education Commission of Pakistan (HEC)**

**2019-2022**

**Rs Million: 9.7**

**Project 11: Co-Pi:** Characterization of Carbohydrate Based Biopolymers and its Nanomaterial Binding Potential and Biological Activities (HEC)

**2018-2019**

**Rs Million: 0.48**

**Project 12: Co-Pi:** Laboratory Bioassays of Maize Stem Borer for determination of efficacy of Bt proteins Funded by Pioneer Seed Corporation USA.

**2014-2016**

**USD: 50,000**

**Project 13: Scientist (Co-Pi):** Transformation of gene constructs and genetically engineered germplasm resources/commercial genotypes resistant to develop cotton leaf curl disease and/or its insect vector working as Scientist in Pak US ICARDA Project to control CLCuV Funded by USDA.

**2011-2017**

**USD: 65,043**

**Project 14. Scientist (Co-Pi):** Development of transgenic cotton with multiple genes resistant to cotton leaf curl virus working as Scientist in PARB Project# 426 to control bollworm weeds and CLCuV Funded by Punjab Agriculture Research Board.

**2011-2017**

**Rs Million: 5.281**

**Project 15. Scientist (Co-Pi):** Genetic Improvement of Cotton for Herbicide and bollworms Tolerance working as Scientist in PARB Project to control Bollworm and Weeds. Funded by Punjab Agriculture Research Board

**2010-2017**

**Rs Million: 14.580**

**Project 16. Scientist (Co-Pi):** Development and Commercialization of Cotton leaf curl Virus Resistant/Tolerant Indigenous Transgenic Bt and Glyphosate Resistant Cotton Hybrids. Funded by Punjab Agriculture Research Board.

**2012-2016**

**Rs Million: 13.170**

**Project 17. Scientist (Co-Pi):** Novel approach to generate wide spectrum resistance to all cotton begomoviruses infecting cotton and other cultivated crops. Funded by Punjab Agriculture Research Board.

**2014-2015**

**Rs Million: 1.10**

## **Consulting Experience**

### **Editorial Boards**

- Technical Editor, INTERNATIONAL JOURNAL “Advancements in Life Sciences” **2013- Present**
- Technical Editor, Maxwell Science, Current Research Journal of Biological Sciences **2010-Present**
- Guest Editor, Scientific World Journal **2012-2013**
- Review Editor, Frontiers in Genetics **2022 onward**

### **Reviewer**

Scientific Reports 2020  
Frontiers in Genetics 2020  
Plos One 2019  
Plant Biotechnology Reports 2015  
Turkish Journal of Biology 2013-Present  
African Journal of Biotechnology, 2011-present

### **Memberships**

General Secretary of Congress of Molecular Biology 2015-till date.  
Member American Society of Plant Biology 2012.  
Lifetime member of American Society of Microbiology.  
Member of auction committee of department  
Incharge of CEMB Stall displayment committee.  
Incharge of CEMB Enzyme Stock management.

### **Honors and Awards**

- Winner of **PAS Professor Zabta Khan Shinwari Gold Medal 2022**
- Winner of the **ICRA-ASIA Young Scientist Innovation Medal 2017**
- Won **Humboldt fellowship award** of Senior Researcher 2016-2018
- Winner of **SATHA Award** for developing multigene cotton 2018
- Awarded **Gold Medal** on April 17, 2014, by Mahnama Kisan-wing in lieu of best performance in Research of my concerned area.
- Awarded **First Technology Award** March 04, 2015, by Invention to Innovation Summit at University of the Punjab for double gene Bt cotton development.
- Awarded **First Technology Award** November 04, 2015, by Invention to Innovation Summit at Haripur University for CEMB Klean Cotton
- Awarded **Second Technology Award** March 04, 2016, by Invention to Innovation Summit at University of the Punjab for multigenic cotton development.
- **Certified Publons Academy Mentor 2020**  
( <https://publons.com/researcher/2553738/abdul-qayyum-rao/>)
- Invited for **Chair** the session in 1<sup>st</sup> international Conference on Applied Chemical Biological and Aquatic Sciences, February 18-20, 2014 Government University Faisalabad.
- Invited Speaker for various conferences and for lectures in national universities.
- External **Examiner** of various national universities.
- Awarded **training Scholarship** by InWent GmbH **Germany** from 2005-2006
- Awarded seven days **training Scholarship** by GenoMed **Turkey** in 2011
- Nominee of **Young scientist of 2010** an article published in National Academy of Young Scientist Pakistan Newsletter 2010.
- Approved Higher Education Commission of Pakistan Supervisor (2009) till date
- Fellowship in National Center of excellence in Molecular Biology (CEMB) (2005)
- Member Board of Studies of University of the Central Punjab
- Member Board of Studies of Bahuaddin Zakariya University Multan

## Invitation and Patents

- **Invited Speaker** to deliver a lecture on genetic Modification and Editing approaches for the Improvement of Important Crop Traits in 2<sup>nd</sup> International Conference on New Trends in Biological Sciences at **Okara University** on January 16, 2023.
- **Invited Speaker** to deliver lecture on “Genome Editing by using CRISPR Cas Technology” in Faculty Development Programme Faculty of MLT at **Riphah International University Lahore** on March 19-20, 2022.
- **Invited for Co-Chair** the session in First International Two Days Conference of Zoology Entitled: Zoological Emerging Scientific trends 2022 (January 18-19) held at **University of the Education Lahore**.
- **Invited Speaker** to deliver lecture on “Advancement of Technology in Plant Sciences” 1st International Conference (Online) Recent Approaches in Plant Sciences at **University of the Education** March 30-31, 2022.
- **Invited Speaker** to deliver lecture on “How to win Grants” in Faculty Development Training Programme faculty of life sci. on September 17-18, 2019, at **University of Central Punjab**.
- **Invited Speaker** to deliver lecture on “Genetic modification of crop plants” on November 18, 2015, at **University of the Central Punjab**.
- Invited Guest Speaker for Symposium entitled “How to write a research article” organized by **Qarshi University Lahore** on October 23, 2014.
- **Invited speaker** in seminar on Transgenic Plants in perspectives of Microbiological Applications sponsored by the Department of Botany, **Lahore College for Women University (LCWU)** and the American Society for Microbiology (ASM) on Feb. 25, 2014.
- **Invited for Chair** the session in Ist international Conference on Applied Chemical Biological and Aquatic Sciences, February 18-20, 2014, **Government University Faisalabad**.
- **Invited Speaker** in Ist international Conference on Applied Chemical Biological and Aquatic Sciences, February 18-20, 2014, **Government University Faisalabad**.

## Patents Granted/In Process

1. Patent # 142243 Entitled: **Novel Transgenic approach to decrease cost of cotton production in Pakistan**. Granted 2016 (**IPO Pakistan**)
2. Patent Application # 328/18 Entitled: **Novel Plant based Biotechnological approach for the production of edible vaccine against NDV of Poultry**. (In Revision) (**IPO Pakistan**)
3. Patent Application # 54/2021 Receipt No 16327 Entitled: **Development of Chewing and Sucking Insect Resistant Cotton through Modified Combination of Bt and Plant Lectin Genes**. (**IPO Pakistan**)
4. Patent Application # awaiting: **CRISPR based genome Editing Approach to Combat Insects Pests and Viruses**. Submitted (**IPO Pakistan**)
5. Patent Application # awaiting: **CRISPR based genome Editing Approach to reduce Vacuolar Invertase during Cold Storage of Potato**. Submitted (**IPO Pakistan**)
6. Patent Application # awaiting: **Plant Based Edible Vaccine against Avian Influenza Virus (H9N2) Virus**. Submitted (**IPO Pakistan**)

## Publications:



**Total Publications: 111**

**Impact Factor Publication: 93**

**Total Impact Factor: 217.852**







**Google Scholar Citations: 1976**

Sr. No	Name of Author	Name of Journal	Title of Publication	Status	Volume & Page	Year Published	Impact Factor	Significance/ cites
1	Yasmeen A, Bakhsh A, Ajmal S Muhammad M, Sadaqat S, Awais M, Latif A, Shahid N and Rao AQ	<b>Acta Physiologiae Plantarum</b>	CRISPR/Cas9-mediated genome editing in diploid and tetraploid potatoes	<b>Published</b>	<a href="https://doi.org/10.1007/s11738-022-03513-4">https://doi.org/10.1007/s11738-022-03513-4</a>	2023	<b>2.736</b>	-
2	Tanveer S, Malik HA, Shahid N, Salis I B, Imran A, Hassan S, Latif A, Yasmeen A, Rao AQ, Shahid AA	<b>Journal of King Saud University Science</b>	Production of Proinflammatory cytokines by expressing Newcastle disease vaccine candidate in corn	<b>Published</b>	<a href="https://doi.org/10.1016/j.jksus.2022.102537">https://doi.org/10.1016/j.jksus.2022.102537</a>	2023	<b>3.829</b>	-
3	Yasmeen A, Shakoor S, Azam S, Bakhsh A, Shahid N, Latif A, Shahid AA, Husnain T and Rao AQ.	<b>Planta</b>	CRISPR/Cas-mediated knockdown of vacuolar invertase gene expression lowers the cold-induced sweetening in potatoes	<b>Published</b>	256:107	2022	<b>4.54</b>	<b>1</b>
4.	Akhtar S, Shahid A A, Shakoor S, Ahmed M, Iftikhar S, Usmaan M, Sadaqat S, Latif A, Iqbal A, and Rao AQ	<b>Plant Science</b>	Tissue specific expression of Bacterial cellulose synthase (Bcs) genes improves Cotton fiber length and strength	<b>Published</b>	<a href="https://doi.org/10.1016/j.plantsci.2022.111576">https://doi.org/10.1016/j.plantsci.2022.111576</a>	2022	<b>5.363</b>	-
5.	Latif A, Azam S, Shahid N, Javed MR, Haider Z, Yasmeen A, Sadaqat S, Shad M, Husnain T and Rao AQ	<b>Nature Scientific Reports</b>	Overexpression of the AGL42 gene in cotton delayed leaf senescence through downregulation of NAC transcription factors	<b>Published</b>	12:21093	2022	<b>4.996</b>	-
6.	Ashraf MA, Shahid AA, Rao AQ, Brown JK and Husnain T	<b>Applied Sciences</b>	Development and Evaluation of the Cotton Leaf Curl Kokhran Virus-Burewala Bidirectional	<b>Published</b>	<a href="https://doi.org/10.3390/app122111275">https://doi.org/10.3390/app122111275</a>	2022	<b>2.838</b>	-

			Promoter for Enhanced Cry1Ac Endotoxin Expression in Bt Transgenic Cotton					
7.	Tariq M, Tabassum B, Bakhsh A, Farooq AM, Qamar Z, Akram F, Naz F, <b>Rao AQ</b> , Malik K and Nasir IA	<b>Molecular Biology Reports</b>	Heterologous expression of cry1Ia12 insecticidal gene in cotton encodes resistance against pink bollworm, <i>Pectinophora gossypiella</i> (Lepidoptera: Gelechiidae); an alternate insecticidal gene for insect pest management	<b>Published</b>	<a href="https://doi.org/10.1007/s11033-022-07824-0">https://doi.org/10.1007/s11033-022-07824-0</a>	2022	<b>2.742</b>	-
8.	Iqbal A, Ali MA, Shafique M, Hassan S, Shahid N, Azam S, Ali Q, <b>Rao AQ</b> and Shahid AA.	<b>Nature Scientific Reports</b>	Engineered resistance and risk assessment associated with insecticidal and weeds resistant transgenic cotton using wister rat model	<b>Published</b>	-	2022	<b>4.996</b>	-
9.	Abbas M.A, Iqbal A, Ahmed M, Rasool G, Awan M.F, Khan M.K.A, <b>Rao A.Q</b> , Shahid A.A and Husnain T	<b>Brazilian Journal of Biology</b>	Transformation of <i>Rhodococcus</i> Pigment Production Hydroxylase (PPH) gene into <i>Camelina sativa</i> : an alternative marker for the detection of transgenic plants	<b>Published</b>	48, <a href="https://doi.org/10.1590/1519-6984.254973">https://doi.org/10.1590/1519-6984.254973</a>	2022	<b>1.651</b>	-
10.	Rasool HA, Latif A, Yasmeen A, Shahid N, Azam S, Bashir A, Husnain T, <b>Rao AQ*</b> , Carter WG and Shahid AA	<b>Molecular Biology Reports</b>	Enhanced expression of plasma membrane intrinsic protein 2 improves cotton fiber length in <i>Gossypium arboreum</i>	<b>Published</b>	<a href="https://doi.org/10.1007/s11033-022-07138-1">https://doi.org/10.1007/s11033-022-07138-1</a>	2022	<b>2.742</b>	-
11.	Sadaqat S, Usman M, Mizna, Shakoor S, ..... <b>Rao A.Q*</b> and Shahid AA	<b>Agrobiological Records</b>	Transformation and Expression Of Gene In Microalgae: From Tools To Applications	<b>Published</b>	7: 29-39 <a href="https://doi.org/10.47278/journal.abr/2021.012">https://doi.org/10.47278/journal.abr/2021.012</a>	2022	-	-
12.	Shad M, Ayoub M, Malik A, Javid M,	<b>Biochemistry and Molecular</b>	Mistranslation of Genetic Codon and	Published	10.36648/247	2022	-	-



	Din SU, Shakoore S, Sadiq K, Usman M, Sajjad M, Ali MA, Rao AQ	<b>Biology Journal</b>	Their Controlling Mechanism in Cell		1-8084.2 2.8.51			
13.	Shad M, Yasmeen A, Azam S, Bakhsh A, Latif A, Shahid N, Salah Ud Din, Sadaqat S, Rao AQ*, Shahid AA	<b>Molecular Biology Reports</b>	Enhancing the resilience of transgenic cotton for insect resistance	Published	doi: 10.1007/s11033-021-06972-z.	2021	<b>2.742</b>	03
14.	Din S, Azam S, Rao A.Q.*, Shad S, Ahmed M, Gul A, Latif A, Ali M.A, Husnain T and Shahid A.A	<b>Plant Cell Reports</b>	Development of broad spectrum and sustainable resistance in cotton against major insects through combination of Bt and plant lectin genes	Published	<a href="https://doi.org/10.1007/s00299-021-02669-6">https://doi.org/10.1007/s00299-021-02669-6</a>	2021	<b>4.964</b>	15
15.	Tahir M.S, Latif A, Bashir S, Shad M, Khan M.A, Gul A, Shahid N, Husnain T, Rao A.Q and Shahid AA	<b>GM Crops and Food</b>	Transformation and evaluation of Broad-Spectrum insect and weedicide resistant genes in <i>Gossypium arboreum</i> (Desi Cotton)	Published	12:1, 292-302	2021	<b>3.118</b>	05
16.	Ali MA, Iqbal A., Khan MAU, Rao AQ, Din S, Shahid AA	<b>Plos One</b>	Biochemical evidence of epicuticular wax compounds involved in cotton-whitefly interaction	Published	16(5): e0250902.	2021	<b>3.752</b>	05
17.	Qamar Z, Nasir IA, Abouhaidar MG, Heferon KL, Rao AQ, Latif A, Ali Q, Anwar S, Rashid B & Ahmad Ali Shahid	<b>Nature Scientific Reports</b>	Novel approaches to circumvent the devastating effects of pests on sugarcane	Published	11-1242B	2021	<b>4.996</b>	06
18.	Shakoore S, Samiullah TR, Shahid N, Rao AQ, Yasmeen A, Tahir S, Latif A, Azam S, Shahid AA and Husnain T	<b>Pakistan Journal of Zoology</b>	In Silico prediction and evaluation of <i>E. coli</i> expressed recombinant HA protein of Avian Influenza virus	Published	DOI: <a href="https://dx.doi.org/10.17582/journal.pjz/20190703110751">https://dx.doi.org/10.17582/journal.pjz/20190703110751</a>	2021	<b>0.687</b>	-
19.	Gul A, Hussain G, Iqbal A, Rao A.Q, Din SU, Yasmeen A, Shahid N, Ahad A, Latif A, Azam S, Samiullah TR, Hassan S, Shahid AA, & Husnain T	<b>Nature Scientific Reports</b>	Constitutive expression of Asparaginase in <i>G. hirsutum</i> triggers insecticidal activity against <i>B. tabaci</i>	Published	10-8958	2020	<b>4.996</b>	05
20.	Yaqoob A, Shahid A.A, Salisu I.B,	<b>PloS One</b>	Comparative analysis of Constitutive and	Published	E 15 (3)	2020	<b>3.752</b>	01

	Shakoor S, Usman M, Shad M and <b>Rao A.Q*</b>		fiber-specific promoters under the expression pattern of Expansin gene in transgenic Cotton					
21.	 Shahid N, Samiullah T.R, Shakoor S, Latif, A, Yasmeen A, Azam S, Shahid A. A, Husnain T and <b>Rao A. Q*</b>	<b>Frontiers in Veterinary Sciences</b>	Early-Stage development of New Castle Disease Vaccine candidate in corn	Published	7.499	2020	<b>3.471</b>	03
22.	 Zahid M, Irshad A, ShakoorS, SamiullahT. Shahid N, Iqbal A, Tanveer .A, Ahmed S, Husnain T, Shahid A.A, <b>Rao A.Q*</b>	<b>Pakistan Veterinary Journal</b>	Engineered recombinant NDV-Fusion protein and its polyclonal antibodies production	Published	2074-7764	2020	<b>1.803</b>	-
23.	 Yaqoob A, Shahid A.A, Imran A, Sadaqat S, Liaqat A, and <b>Rao A.Q</b>	<b>Biologia</b>	Dual functions of Expansin in both cell wall extension and compression during Cotton fiber development	Published	Biologia a <a href="https://doi.org/10.2478/s11756-020-00514-x">https://doi.org/10.2478/s11756-020-00514-x</a>	2020	<b>1.350</b>	-
24.	 Ahmed M*, Shahid A.A, Latif A, Din S.U, Xuede W, Rao* A.Q and Husnain T	<b>Frontiers in Plant Sciences</b>	Overexpression of a sucrose synthase gene Indirectly improves cotton fiber quality through sucrose cleavage	Published	11, 1-13	2020	<b>5.753</b>	01
25.	 Ali Q, Salisu I.B, Shahid A.A, Liaqat A and Rao A. Q	<b>Journal of Food and Chemical Toxicology</b>	A 90–day subchronic toxicity study of transgenic cotton expressing Cry1Ac, Cry2A and CP4–EPSPS proteins in Sprague–Dawley rats Accepted Journal of Food and Chemical Toxicology	Published	<a href="https://doi.org/10.1016/j.fct.2020.111783">https://doi.org/10.1016/j.fct.2020.111783</a>	2020	<b>6.023</b>	06
26.	 Salisu I.B, Shahid A.A, Yaqoob A, Gul A and Rao A.Q	<b>Journal of Animal Physiology and Animal Nutrition</b>	Evaluation of the Effect of subchronic feeding of transgenic cotton line (CKC-1) on the faecal microbiota of albino rabbits	Published	DOI: 10.1111/jpn.13471	2020	<b>2.130</b>	02

27	Shahid N, Tahir S, <b>Rao A. Q*</b> , Rehman TR	<b>Acta Virologica</b>	<i>E. coli</i> expression and immunological assessment of expressed recombinant Newcastle disease virus hemagglutinin-neuraminidase protein in chickens	Published	64 331-337	2020	<b>1.162</b>	-
28.	Bajwa K.S, Ali MA, <b>Rao A.Q*</b> , Shahid A.A and Husnain T	<b>Journal of Agricultural Science and Technology</b>	Combination of Cry1Ac and Cry2A to Produce Resistance Against <i>Helicoverpa armigera</i> in Cotton	Published	22(6) 1587-1601	2020	<b>0.897</b>	01
29.	Iqbal A, Latif A, Galbraith D, Jabbar B, Ali M.A, Ahmad M, Gul A, <b>Rao A. Q</b> , Shahid A.A, and Husnain T.	<b>Journal of Plant Biochemistry and Biotechnology</b>	Structure-Based Prediction of Protein-Protein Interactions between GhWlim5 Domain1 and GhACTIN-1 Proteins: A practical evidence with improved fiber strength	Published	<a href="https://doi.org/10.1007/s13562-020-00603-7">https://doi.org/10.1007/s13562-020-00603-7</a>	2020	<b>1.175</b>	05
30.	Yaqoob A, Bashir S, Rao AQ, Shahid AA	<b>Plant Breeding</b>	Transformation of $\alpha$ -EXPA1 gene in Cotton and its effects on fiber improvement	Published	DOI: 10.1111/pbr.12878	2020	<b>1.832</b>	-
31.	Zubair M, Latif A, <b>Rao AQ*</b> , Azam S, Shahid N, Samiullah TR, Shahid AA, Nasir IA, Husnain T	<b>Molecular Biotechnology</b>	A Combinational approach of enhanced methanol production and double Bt genes for broad spectrum insect resistance in transgenic cotton	Published	1-11	2019	<b>2.695</b>	05
32.	Yaqoob, A.; Shahid, A. A.; Salisu, I. B.; Azam, S.; Ahmed, M.; <b>Rao, A. Q</b>	<b>Spanish Journal of Agricultural Research</b>	Effects of Cry toxins on non-target soil bacteria during a 2-year follow-up study	Published	17(2), e0303	2019	<b>1.238</b>	02
33.	Irshad, A., Zahid, M., Husnain, T, <b>Rao A.Q</b> , Sarwar N and Hussain I	<b>Appl Nanosci</b>	A proactive model on innovative biomedical applications of gold nanoparticles	Published	9, 1-13	2019	<b>3.674</b>	04
34.	Salisu B I, Ali A, Yaqoob A, <b>Rao AQ</b> , Innayat U and Husnain T	<b>J Anim Physiol Anim Nutr</b>	Assessing the fate of recombinant plant DNA in rabbit's tissues fed genetically modified cotton	Published	00:1-9	2019	<b>1.597</b>	01
35.	Shahid A.A, Haider T, Samiullah T.R, Ali M.A, Bajwa	<b>The Journal of Animal &amp; Plant Sciences</b>	Risk Assessment Of Transgenic Cotton Harboring BT and	Published	29(6)	2019	<b>2.130</b>	-

	K.S, <b>Rao A.Q</b> , Salisu I.B, and Husnain T		Glyphosate Resistance gene on Fish ( <i>Labeo rohita</i> )					
36.	Qamar Z, Tariq M, Rehman T, Iqbal MS, Sarwar MB, Sharif MN, ..... <b>Rao AQ</b> , Haider MS, Malik TH and Nasir IA	<b>Adv Life Sci</b>	Trackable CEMB- Klean Cotton Transgenic Technology: Affordable Climate Neutral Agri-biotech Industrialization for Developing Countries	Published	6(3): 131- 138	2019	0.00	-
37.	Shakoor S, Shahid N, Yaqoob A, <b>Rao A.Q</b> , Latif A, Shahid AA and Husnain T	<b>Acta Virologica</b>	Role of Oral vaccine as an edible tool to prevent infectious diseases	Published	63: 245 – 252	2019	<b>1.162</b>	06
38.	Latif A, Ahmed M, Akhtar S, Ahad A, Iqbal A, Yaqoob A, Imran A, Usmaan M, Shahid N, Azam S,Ajmal S, Ali M A, Hassan S, Shad M, Sadaqat, Zahid M, Shahid A A, Nasir I A, <b>Rao A Q</b> and Husnain T	ICAC Recorder	Cotton Fibre Quality Management for Sustainable Textile Industry	Published	XXXVI I	2019	0.00	-
39.	Ali Q, Salisu IB, Raza A, Shahid AA, <b>Rao AQ</b> and Husnain T	MethodsX	A modified protocol for rapid DNA Isolation from cotton Gossypium spp	Published	6 259- 264	2019	0.00	03
40	Salisu B I. Shahid A.A, Yaqoob A, <b>Rao A.Q</b> and Husnain T	<b>J Animal Physiology and Animal Nutrition</b>	Effect of dietary supplementation of recombinant Cry and Cp4epsps proteins on hematological indices of growing rabbits	Published	1–12	2018	<b>1.597</b>	02
41	Ahmed M, Akhtar S, Fanglu MA, Hasan MDMU, Shahid AA, Yanang X, Sarwar MB, <b>Rao AQ</b> , Husnain T and Wang X	<b>Russian Journal of Plant Physiology</b>	Sucrose Synthase (SuSy) Gene Expression: An Indicator for Cotton Fiber Initiation and Early Development	Published	<a href="https://doi.org/10.1134/S1021443719010023">https:// doi.org /10.113 4/S10 214437 19010 023</a>	2018	<b>1.481</b>	08
42.	Ahmed M, Shahid AA, Akhtar S, Zeeshan A, Din S U, WangX, <b>Rao AQ</b> , Sarwar B, HusnainT and	<b>Biologia</b>	Sucrose synthase genes: a way forward for cotton fiber improvement	Published	73:703 –713	2018	<b>1.350</b>	08

	Wang X							
43.	Ahmed M, Shahid AA , Din S U , Akhtar S, Ahad A , <b>Rao A Q</b> , Bajwa K S , Khan MAU , Sarwar MB and Husnain T	<b>Pak. J. Bot</b>	An overview of Genetic and Hormonal control of cotton fiber development	Published	50(1): 433-443	2018	<b>0.972</b>	14
44.	Ahad A, Yaqoob A, Nawaz R, Gul A, Shahid N, Rehman TSU, <b>Rao AQ</b> , Shahid AA and Husnain T	Cogent Food & Agriculture	Multidimensional roles of flavonoids in background of <i>Gossypium hirsutum</i>	Published	4: 1510754.	2018	0.00	01
45.	Salisu B I. Shahid A.A, Ali Q, <b>Rao A.Q</b> and Husnain T	<b>Frontiers in Nutrition</b>	Nutritional Assessment of Dietary Bt and Cp4EPSPS Proteins on the Serum Biochemical Changes of Rabbits at Different Developmental Stages	Published	5:49	2018	<b>6.576</b>	11
46.	Ahad A, Tahir S , Ali MA, Iqbal A, Ahmed M, Akhtar S, Nawaz R, <b>Rao AQ</b> , Shahid AA, Rahman ZU and Husnain T	International Journal of Biosciences	Functional prediction of F3'5'H in color alteration in cotton: an in-silico comparative analysis between cotton and viola	Published	13 (3) 185-197	2018	0.00	-
47.	Ahmad A, RehmanMZU,HameedU, <b>Rao A Q</b> Ahad A, Yasmeen A, Akram F, Bajwa K SScheffler J, Nasir I A, Shahid A A, Iqbal MJ Husnain T, Haider M S and BrownJ K	<b>Viruses</b>	Engineered Disease Resistance in Cotton Using RNA-Interference to Knock down Cotton leaf curl Kokhran virus-Burewala and Cotton leaf curl Multan betasatellite Expression	Published	9, 257	2017	<b>5.048</b>	12
48.	Salisu I B, Shahid A A,Yaqoob A, Ali Q, Bajwa K S, <b>Rao A Q</b> and Husnain T	<b>Frontiers in Plant Sciences</b>	Molecular approaches for high throughput detection and quantification of genetically modified crops: A review	Published	16;8:1670	2017	<b>5.753</b>	30
49.	Shahid, N, <b>Rao, A.Q</b> , Elise K, Van B, Zeeshan, A; Samiullah, Tabassum, B; Azam &Husnain T	<b>Worlds Poultry Science Journal</b>	A concise review of poultry vaccines and future implementation of plant-based vaccines in poultry	Published	73, 1-12	2017	<b>2.915</b>	03

50.	Majid MU, Awan MF, Fatima K, Tahir MS, Ali Q, Rashid B, <b>Rao AQ</b> , Nasir IA, Husnain T	<b>Cytology and Genetics</b>	Genetic Resources of Chili Pepper ( <i>Capsicum annuum</i> L.) against <i>Phytophthora capsici</i> and Induction through Various Biotic&Abiotic Factors	Published	51, 4, 296–304	2017	<b>0.579</b>	11
51.	Ali S, Nasir I A, Rafiq M, Butt S J, Ihsan F, <b>Rao A Q</b> and Husnain T	<b>Iranian Journal of Biotechnology</b>	Sugarcane Mosaic Virus-Based Gene Silencing in <i>Nicotiana benthamiana</i>	Published	15(4):e1536	2017	<b>1.671</b>	02
52.	Sajid M, Hassan Z, Sehrai G H, Rana M A, Puchta H and <b>Rao A Q</b>	<b>Advancement in Life Sciences</b>	Plant genome editing using engineered nucleases and success of CRISPR/Cas9 system		4(4) 127-136	2017	0.00	01
53.	<b>Rao, A.Q.</b> , Latif, A., Azam, S., Gul, A., Yaqoob, A., Din, S., Akhtar S., Shahid N., Shahid. A.A.,Nasir, I.A. and Husnain, T	ICAC Recorder	Management of Biotic Stress in Cotton	Published	2(1)	2017	0.00	-
54.	Yasmeen A, Kiani S,Butt A, <b>Rao AQ</b> , Akram F, Ahmad A, Nasir IA, Husnain T, Mansoor S, Amin I, Aftab S, Zubair M, Tahir MN, Akhtar S, Scheffler J Scheffler B	<b>Molecular Biotechnology</b>	Amplicon based RNA interference targeting V2 gene of Cotton leaf curl Kokhran virus-Burewala strain can provide resistance in transgenic cotton plants	Published	58(12): 807-820	2016	<b>2.695</b>	13
55.	Ahmad A, Javed MR, <b>Rao AQ</b> and Husnain T	<b>BMC Complementarity and Alternative Medicine</b>	Designing and screening of universal drug from neem ( <i>Azadirachta indica</i> ) and standard drug chemicals against influenza virus nucleoprotein	Published	16:519	2016	<b>3.659</b>	28
56.	Ramzan M, Tabassum B, Nasir IA, Khan A, Tariq <b>Rao AQ</b> , Bhatti MU, Toufiq N and Husnain T	<b>Biotechnology &amp; Biotechnological Equipment</b>	Identification & application of biocontrol in Cotton leaf curl virus disease in <i>G. hirsutum</i> under greenhouse conditions	Published	30(3) 469-478	2016	<b>1.632</b>	17
57.	Ali, A., Nasir, I. A., Muzaffar, A., Iqbal, S., <b>Rao, A.Q.</b> , Husnain, T.	<b>Journal of Food Quality</b>	Screening of potato germplasm resistant against low temperature sweetening	Published	39(4) 301-310	2016	<b>2.450</b>	03

58.	Khan A, Nasir IA, Tabassum Bushra, Aaliya K, Tariq M and <b>Rao AQ</b>	<b>Plant Cell and Organ Culture</b>	Expression studies of Chitinase gene in transgenic potato against <i>Alternaria solani</i>	Published	128(3), 563-576	2016	<b>2.711</b>	19
59.	Yaqoob A, Shahid AA, Samiullah TR, <b>Rao A Q</b> , Khan MAU, Tahir S, Mirza SA and Husnain T	<b>Journal of the Science of Food and Agriculture</b>	Risk assessment of Bt crops on the non-target plant associated insects and soil organisms	Published	96.8: 2613-2619.	2016	<b>3.638</b>	26
60.	Awan MF, Ali A, Muzaffar A, Abbas MA, <b>Rao AQ</b> , Nasir IA, Khan GA, Butt SM, Rasheed B, Qamar Z and Husnain T	<b>Pakistan Journal of Agricultural Sciences</b>	Transgenic Cotton: harboring broad term resistance against insect and weeds through incorporation of CEMB double Bt and cp4EPSPSgenes	Published	53(3), 501-505	2016	<b>0.748</b>	06
61.	Hameed A, Nasir I.A, Tabassum, Qamar Z. Zameer M, Younus M, <b>Rao AQ</b> , Rashid B, Tariq M, Khan GA, Ali M, Anjum MS, Ahmed S, Bhatti JA, Samiullah TR, and Husnain T	<b>Journal of Animal and Plant Sciences</b>	Biosafety Assessment of locally developed transgenic Sugarcane	Published	26(4):1 124-1132	2016	<b>0.490</b>	05
62.	Majid MU, Awan MF, Fatima K, Tahir MS, Ali Q, Rashid B, <b>Rao AQ</b> , Nasir IA, Husnain T	<b>Zemdirbyste-Agriculture</b>	<i>Phytophthora capsici</i> on chilli pepper ( <i>Capsicum annum L.</i> ) and its management through genetic and bio-control: a review	Published	103, (4), 419-430	2016	<b>1.083</b>	17
63.	Ali A, Awan M S, Nasir IA, <b>Rao AQ</b> and Husnain T	<b>Biotechnology Reports</b>	Evaluation of two cotton varieties CRSP1 and CRSP2 for genetic transformation efficiency, expression of transgenes Cry1Ac+Cry2A, GT gene and insect mortality	Published	9, 66-73	2016	0.00	09
64.	Majid MU, TahirMS, Ali Q, <b>Rao AQ</b> , RashidB, Ali A, NasirIA, and Husnain T	<b>Arch Neurosci</b>	Nature and History of Ebola Virus: An Overview	Published	3(3):e3 5027	2016	<b>0.00</b>	12
65.	Ahmad, A., Riaz, M. R., <b>Rao, A. Q.</b> , Khan, M. A. U.,	<b>Frontiers in Plant Sciences</b>	In Silico determination of the insecticidal potential	Published	6:1081	2015	<b>5.753</b>	16

	Ahad A, Din, S., Husnain, T		of Vip3Aa-Cry1Ac fusion protein against Lepidopteran targets by using molecular docking					
66.	Ahad, A., Ahmad, A., ud Din, S., Rao, A. Q., Shahid, A. A., Husnain, T	<b>Frontiers in Plant Sciences</b>	In silico study for diversing the molecular pathway of pigment formation: an alternative to manual coloring in cotton fibers	Published	6, 751.	2015	<b>5.753</b>	10
67.	Bajwa, K. S., Shahid, A. A., Rao, A. Q., Bashir, A., Aftab, A., Husnain, T.	<b>Frontiers in Plant Sciences</b>	Stable Transformation and Expression of GhEXPA8 Fibre Expansin Gene to Improve Fibre Length and Micronaire Value in Cotton.	Published	6:838	2015	<b>5.753</b>	34
68.	Puspito, A. N., Rao, A. Q., Hafeez, M. N., Iqbal, M. S., Bajwa, K. S., Ali, Q., Abbas, M. A., Latif, A., Shahid, A. A., Nasir, I. A., Husnain, T.	<b>Frontiers in Plant Sciences</b>	Transformation and evaluation of Cry1Ac+Cry2A and GTGene in <i>Gossypium hirsutum</i> L.	Published	6(943)	2015	<b>5.753</b>	43
69.	Muzaffar, A., Kiani, S., Khan, M. A. U., Rao, A. Q., Ali, A., Awan, M. F., Iqbal, A., Nasir, I. A., Shahid, A. A., Husnain, T.	<b>Biological research</b>	Chloroplast localization of Cry1Ac and Cry2A protein-an alternative way of insect control in cotton	Published	48, 1-11	2015	<b>7.634</b>	23
70.	Awan, M., Abass, M., Muzaffar, A., Ali, A., Tabassum, B., Rao, A.Q., Ahmad Nasir, I., Husnain, T.	<b>Journal of Agricultural Science and Technology</b>	Transformation of Insect and Herbicide Resistance Genes in Cotton ( <i>Gossypium hirsutum</i> L.)	Published	17(2), 287-298	2015	<b>1.098</b>	25
71.	Rao, A. Q., Khan, M. A. U., Shahid, N., Din, S. U., Gul, A, Muzaffar, A., Azam, S., Samiullah, T.R.Batool, F., Shahid, A. A., Nasir, I. A., Husnain, T.	<b>Biologia</b>	An Overview of Phytochrome; An important Light Switch and Photosensory Antenna for Regulation of Vital Functioning of Plants	Published	70/10: 1273—1283	2015	<b>1.350</b>	01
72.	Shahid, N., Tahir, S., Rao, A.Q., Hassan, S., Khan	<b>Biologia</b>	<i>E.coli</i> expression of NDV fusion protein gene and	Published	70/12: 1553—1564	2015	<b>1.350</b>	04



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73.	Khan MAU, Shahid AA, <b>Rao AQ</b> , Bajwa KS, Muzaffar A, Samiullah TR, Nasir IA, Husnain T	<b>Iranian Journal of Biotechnology</b>	Molecular and Biochemical Characterization of Cotton Epicuticular Wax in Defense against Cotton Leaf Curl Disease CLCuD)	Published	13 (4) 10-16	2015	<b>1.671</b>	13
74.	Latif, A., <b>Rao, A. Q.</b> , Khan, M. A., Shahid, N., Bajwa, K. S., Ashraf, M. A., Husnain, T.	<b>BMC research notes</b>	Herbicide-resistant cotton ( <i>Gossypium hirsutum</i> ) plants: an alternative way of manual weed removal	Published	8(1), 453. 1-8	2015	0.00	25
75.	Ahmad, A., Ahad, A., <b>Rao, A. Q.</b> , Husnain, T.	Bioinformation	Molecular docking-based screening of neem-derived compounds with the NS1 protein of Influenza virus	Published	11(7), 359	2015	0.00	11
76.	Khan, M. A. U., Shahid, A. A., <b>Rao, A. Q.</b> , Azam, S., Ahmad, A., Ahmad, M., Husnain, T.	Mycopath	Comparison of different species of cotton for the transmission of CLCuV through whitefly.	Published	13(1), 57-66	2015	0.00	-
77.	Khan, M. A. U., Shahid, A. A., <b>Rao, A. Q.</b> , Shahid, N., Latif, A., ud Din, S., Husnain, T.	Advancements in Life Sciences	Defense strategies of cotton against whitefly transmitted CLCuV and Begomoviruses	Published	2(2), 58-66	2015	0.00	15
78.	Rehman R.A, <b>Rao A.Q</b> , Ahmed Z and Gul A	Advancements in Life Sciences	Selection of potent bacterial strain for over-production of PHB	Published	3(1)	2015	0.00	04
79.	Shahid A.A,Shaukat M s,Bajwa KM, <b>Rao AQ</b> and Husnain T	World Academy of Science, Engineering and Technology	Detection of Transgenes in Cotton <i>G. hirsutum</i> by Using Biotechnology/ MolecularBiological Techniques	Published	9(1) 87-92	2015	0.00	-
80.	Ashraf M.A, Shahid AA, <b>Rao AQ</b> , Shahzad K. B and Husnain T	<b>Viruses</b>	Functional Characterization of a Bidirectional Plant Promoter from Cotton Leaf Curl Burewala Virus Using an Agrobacterium-Mediated Transient Assay	Published	6, 223-242	2014	<b>5.048</b>	21

81.	Nasir I.A, Tabassum B, Qamar Z, Javed M.A, Tariq M, Farooq A.M, Butt S.J, Qayyum. A, Husnain T	<b>Turkish Journal of Biology</b>	Herbicide-tolerant sugarcane ( <i>Saccharum officinarum</i> L.) plants: An unconventional way of weed removal	Published	38: 439- 449	2014	<b>1.452</b>	19
82.	Ali, S., Nasir, I. A., Ali, A., Aslam, U., Farooq, A. M., Tariq, M.Tabassum, B., Qamar, Z., Samiullah, T.Rao, A.Q	African Journal of Biotechnology	Genetic variability in coat protein gene of sugarcane mosaic virus in Pakistan and its relationship to other strains	Published	13(39), 3950- 3965	2014	<b>0.000</b>	03
83.	Hussain T, Bakhsh A, Munir B, Hassan S, <b>Rao AQ</b> , Shahid AA, Rashid B and Husnain T	<b>Emir. J. Food Agriculture</b>	Mendelian segregation pattern and expression studies of insecticidal gene (cry1Ac) in insect resistant cotton progeny	Published	26 (8): 706- 715	2014	<b>1.041</b>	05
84.	Akhtar S, Shahid AA, <b>Rao AQ</b> , Bajwa KS, Muzaffar A, Latif A, Husnain T.	Advancement in life sciences	Genetic effects of <i>Calotropis procera</i> CpTIP1 gene on fiber quality in cotton ( <i>Gossypium hirsutum</i> )	Published	1(4)22 3-230	2014	0.00	12
85.	Ali MA, Rehman I, Iqbal A, Din S, <b>Rao AQ</b> , Latif A, Samiullah TR, Azam S, Husnain T	Advancement in life sciences	Nanotechnology, a new frontier in Agriculture	Published	1(3), 129- 138	2014	0.00	111
86.	Bajwaa K S, Shahid A.A, <b>Rao AQ</b> , Dahab A H A, Muzaffar A, Rehman H, Ahmad M, Shaukat MS, Gul A, Ahad A and Tayyab Husnain	Advanced Crop Science	Stable genetic transformation in cotton ( <i>Gossypium hirsutum</i> L.) using marker genes	Published	4(1)1- 11	2014	0.00	-
87.	Khawar KM, Bakhsh A, Aasim M and <b>Rao AQ</b>	<b>The Scientific World Journal</b>	Editorial Plant Biotechnology	Published	doi:10. 1155/2 013/73 6731	2013	<b>1.73</b> Publicati on time	-
88.	Bajwaa K S, Shahid A.A, <b>Rao AQ</b> , Dahab AHA,, Muzaffar A, Rehman H, Ahmad M, Shaukat MS, Gul A, Ahad A and Tayyab Husnain	<b>Australian Journal of Crop sciences</b>	Expression of <i>Calotropis procera</i> expansion gene CpEXPA3 enhances Cotton fiber strength	Published	7(2): 206- 212	2013	<b>1.600</b> At the time of publicati on	30

89.	* <b>Rao A.Q</b> , Bakhsh A, Mehmood A., Shahid AA., Shahzad K., Malik A and Husnain.T.	<b>Journal of Agricultural Science and Technology</b>	Variation in expression of Arabidopsis thaliana Phytochrome B gene in cotton due to difference in Transgene copy no	Published	15: 1033-1042	2013	<b>1.098</b>	12
90.	Azam. S, Sami Ullah TR, Yasmeen A, <b>Rao A.Q</b> , Iqbal A, Din.S, Nasir I.A, Rashid B, Shahid AA, Ahmad M and Tayyab Husnain	Advancements in Life Sciences	Dissemination of Bt cotton in cotton growing belt of Pakistan	Published	1(1), 18-26	2013	0.00	24
91.	Imran M, Shahid AA, Samiullah TR, Bajwa KS, <b>Rao AQ</b> and Husnain T	Mycopath	Evaluation of potential impact of GM cotton on Chicks	Published	11(2): 109-117	2013	0.00	01
92.	Ashraf M.A, Shahid AA, <b>Rao A.Q</b> , Shahzad K. B, Khan M.A, Haider S, Husnain T	<b>Australian Journal of Crop sciences</b>	Molecular characterization and phylogenetic analysis of a variant of infectious cotton leaf curl Burewala virus associated with CLCuD from Pakistan	Published	7(8):11 13-1122	2013	<b>1.60</b> At the time of publication	07
93.	Shahid A.A, <b>Rao A.Q</b> , Bakhsh A and Husnain T	<b>Archives of Biological Sciences</b>	Entomopathogenic Fungi as Biological Controllers: New Insight into their Virulence and Pathogenicity	Published	64 (1), 21-42	2012	<b>0.956</b>	160
94.	Bakhsh A, <b>Rao A.Q</b> , Shahid AA, Husnain T	Not Sci Biol	Spatio Temporal Expression Pattern of an Insecticidal Gene (Cry2A) in Transgenic Cotton Lines	Published	4(4):11 5-119	2012	0.00	22
95.	Rahman M, <b>Rao A.Q</b> , Batool F, Azam S, Shahid AA & Husnain T	<b>Journal of Animal and Plant Sciences</b>	Transgene copy number and Phenotype variation in transgenic basmati rice	Published	22(4) 1004-1013	2012	<b>0.490</b>	13
96.	Bakhsh A, <b>Rao A.Q</b> , Khan GA, Rashid B, Shahid AA, Husnain T	<b>Journal of Agricultural Sciences (TarmBilimleri Araştırma Dergisi)</b>	Insect Resistance Studies of Transgenic Cotton Cultivar Harboring Cry1Ac and Cry2A	Published	5 (2): 167-171	2012	<b>0.636</b>	02
97.	Rahman M, Hussain K, Khan AM,	Pure Appl. Bio	An insight of cotton leaf curl virus: A	Published	1(3): 52-58	2012	0.00	12

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98.	<b>*Rao A.Q</b> , Irfan M, Saleem Z, Nasir IA, S.Riazuddin and Husnain T. (2011)	<b>Journal of Zhejiang University SCIENCE B</b>	Overexpression of Phytochrome B gene from <i>Arabidopsis thaliana</i> increases plant growth and yield of cotton ( <i>Gossypium hirsutum</i> )	Published	12(4):326-334	2011	<b>5.552</b>	54
99.	Bakhsh A, <b>Rao A.Q</b> , Shamim Z and Husnain T	<b>Archives of Biological Sciences</b>	A minireview: Rubisco small subunit as a strong green tissue specific promoter	Published	63 (2), 299-307	2011	<b>0.956</b>	23
100	<b>*Rao A.Q</b> , Bakhsh A, Nasir IA, S.Riazuddin and Husnain T	<b>African Journal of Biotechnology</b>	Phytochrome B mRNA expression enhances Biomass yield and physiology of cotton plants	Published	10(10), 1818-1826.	2011	<b>0.500</b> At the time of publication	30
101	Khan A, Shahid A.A, <b>Rao A.Q</b> , Kiani.S, Ashraf MA, Muzaffar A and Husnain T	<b>African Journal of Biotechnology</b>	Role of Epicuticular Waxes in the Susceptibility of <i>Gossypium arboreum</i> cotton	Published	10(77), 17868-17874	2011	<b>0.500</b> At the time of publication	12
102	Bakhsh A, <b>Rao A.Q</b> , A. A, Ahmed, Husnain T and S. Riazuddin	Aust J Basic Appl Sci	35S CaMV a developmental Promoter in being Temporal and spatial expression of Cry1Ac and Cry2A genes in Cotton	Published	4(1): 37-44	2010	0.00	48
103	Samiullah, T.R., Bakhsh, A., <b>Rao, A.Q.</b> , Naz, M., Saleem, M	Advances in Environmental Biology	Isolation, Identification and characterization of $\beta$ glucosidasase from bacillus Sp	Published	3(3): 269-277	2010	0.00	11
104	Maqbool. A., Abbas.W., <b>Rao A.Q.</b> , Irfan M., Zahoor.M., Bakhsh A, Husnain T and S. Riazuddin	<b>Biotechnology Progress</b>	<i>Gossypium arboreum</i> heat shock gene HSGP6 enhances drought tolerance in <i>Gossypium hirsutum</i>	Published	26(1). 21-25	2009	<b>2.681</b>	75
105	S.S. Hussain, <b>A.Q. RAO</b> , T. Husnain and S. Riazuddin	<b>Biologia Plantarum</b>	Cotton somatic embryo morphology affects its conversion to plant	Published	53(2): 307-311	2009	<b>1.747</b>	30
106	Bakhsh A, <b>Rao A.Q</b> , A. A, Ahmed, Husnain T and S. Riazuddin	American-Eurasian J. Agric. & Environ. Sci	Insect Resistance and Risk assessment studies in Advance lines of Bt Cotton harboring CryIAC and CryIIA genes	Published	6 (1): 01-11	2009	0.00	54

107	* <b>Rao A.Q</b> , Shahzad M. S, Hussain S.S, Bokhari S. Y. A, Raza H.M, Husnain T and S. Riazuddin.	<b>Journal of Zhejiang University SCIENCE B</b>	Somatic Embryogenesis in Wild Relatives of Cotton ( <i>Gossypium Spp.</i> )	Published	(4), 291-298	2006	<b>3.066</b>	63
108	Shahzad S, Abbas S. Y, <b>Rao A.Q</b> , Raza M. H, Ullah O, Rahman Z, Shahid A. A, Ahmed, and S. Riazuddin	ARCH. MED. SAD. KRYM	Population Studies of STR Markers Loci D3S1358, D5S818, D7S820, D18S51 and FGA (FIBRA) in Sindhi and NWFP Populations of Pakistan for Forensic Use	Published	215-222	2004	0.00	-
109	Saeed A, Afzal S, Hussain M.W, Abbas S. Y, Shahzad S, <b>Qayyum A</b> and Raza H.M	<b>J of Animal and Veterinary Advances</b>	Effect of Aflatoxin B1 on Different Body Tissues of <i>Gallus domesticus</i>	Published	2 (2): 76-78	2003	<b>0.365</b> At the time of publication	07
110	S.Y.A Bokhari, M.S Shahzad, <b>A. Qayyum</b> , M.H. Raza, F. Arshad, M. Shafique, Z. Rahman, A.A Shahid, Z. Ahmad And s. Riazuddin	<b>Pakistan Journal of Zoology</b>	DEVELOPMENT OF STR MULTIPLEX SYSTEM (D5S818, D7S820 AND D18S51) FOR FORENSIC CASEWORK	Published	23,167-174,	2003	<b>0.831</b>	-
111	Abid M, <b>Qayyum A</b> , Dasti A, Niazi S, K. Hussain, S.	Journal of Res Science).	Effect of Salinity and SAR of irrigation water on Yield and, Physiological Growth parameters of Maize ( <i>Zea mays L</i> ) and properties of the soil	Published	12(7)	2002	0.00	30

### Submitted Papers/Processed Articles/expected publication in near future

	<b>Authors</b>	<b>Title</b>	<b>Journal</b>	<b>Stage</b>
1	Shakoore S, Sadaqat S, Riaz W, Raza T, Yasmeen A, Shahid N, Husnain T, Puchta H, Shahid A A, <b>Rao A Q*</b>	In Vivo Testing of CLCuV knockout through CRISPR Cas9 multiplex based genome editing to confer resistance in cotton	Biological Research	Submitted
2	Ajmal S, Shakoore S, Sadaqat S, Riaz W, Raza T, Yasmeen A, Shahid N, Husnain T, Puchta H, Shahid A A, <b>Rao A Q*</b>	Cas12 mediated in planta defense strategy of cotton against CLCuV through knock out of Beta C1 and DNA A	-	In Preparation

## **Presentations and Abstract Published in Conference Proceedings:**

- Rao A.Q et al (2023) 'Exotic' Gene Expression and Genome Editing Strategies for Improvement of Important Crop Traits International Conference on Mitigation and Adaptation: Focus on Agriculture and Food Security Date: 6-9 February 2023 FCCU, Lahore, Pakistan
- Bakhsh A and Rao AQ (2023) Genome editing approach for better crop production and protection and regulatory landscape worldwide International Conference on Mitigation and Adaptation: Focus on Agriculture and Food Security Date: 6-9 February 2023 FCCU, Lahore, Pakistan
- Rao et al (2022) Expression of Aspartic acid in cotton Two days International Conference of Plant Molecular Biology (ICPMB) at CEMB **December 14-15**, 2022.
- Rao A.Q.....(2021) Genome editing and genetic modification approaches for crop traits improvements published in proceeding of Science technology and development of innovative technologies Turkmenistan.
- Husnain, T; **Rao, A.Q**; Latif A; Ahad A, Din S, Gull A, Azam S, Bashir S, Sadaqat R, Maqsood M, Abid M, Hussain M, Maqsood M, Ejaz R, Akhlaq F, Mukhtar A, Aktar S, Iqbal A, Yaqoob A, Iqbal T, Shahid N, Azam M, Samiullah TR, Salisu IB. Shahid A.A, Nasir IA (2018) Multiple gene transformation in cotton to improve insect, weedicide resistance and fibre improvement **ICGI** May 28 June 1, Edinburgh UK:
- Shad M, Malik A, Din S, Usman M, Shahid N, Latif A, Ahmad Mukhtar, **Rao AQ**, Shahid AA and Husnain T (2018) Mistranslation of genetic code and its controlling mechanism in cell 3<sup>rd</sup> international symposium on advances in molecular biology of plants and health sciences.
- Usman M, Sadaqat S, Shad M, Liaqat A, Gulzaib, Mizna, Malik A, Zahid M, Azam S, Yasmeen A, **Rao A Q**, Shahid AA and Husnain T (2018) Expression of foreign genes in microalgae 3<sup>rd</sup> international symposium on advances in molecular biology of plants and health sciences.
- Rao A.Q**, Husnain T (2014) Transformation of different miRNA & RNAi based constructs against CLCuV and its insect vector for the development of virus resistant transgenic cotton in **ICGI proceedings** 25-28 September, 2014.
- Bakhsh A, Ayyaz M, **Qayyum A**, Shahid AA and Husnain T (2014) Insecticidal gene (Cry1Ac) in transgenic Bt cotton under the control of tissue specific promoter (rbcS) exhibits enhanced resistance against Lepidoptera's. **Plant Physiology and Genetics Achievements and Challenges** Bulgaria 26-26 September 2014
- Rashid B, Maqbool A, Qasir U, Irfan M, Khan MY, Zahoor M, Batool F, Jamal A, Sarwar B, **Rao AQ** Husnain T. (2012). Search of drought tolerant genes/transcription factor from *Gossypium arboretum* and its transformation in *Gossypium hirsutum*. Poster presented at International Cotton Genome Initiative conference (ICGI). Raleigh, North Carolina, USA, October 09-12, 2012.
- Bakhsh A, Aasim M, **Rao A.Q**, Shahid AA, Khawar K.M, Ozcan S, and Husnain T (2011) Paradigms of biotechnology in Pakistan Abstracts published in **Current Opinion in Biotechnology** p s85, 22S: S15–S152.

- Dietrich, C., **Qayyum, A.**, Winter, S.: (2006): Characterization of Johnsongrass chlorotic stripe mosaic virus (JCSMV) p15 protein published in 55th plant pest management conference 25-28 September 2006 George-August university Gottingen Germany.
- Rashid, B., Majeed, **A. Qayyum, A.**, Saleem, M., Hussain, T. and Riazuddin, S. (2004) genetic Manipulation of Pakistani Cotton Varieties. Published in First National Conference on Agriculture Biotechnology from August 16-18, 2004. pp 122.
- Nusratullah Khan, S. Yassir Abbas Bokhari, M. Saqib Shahzad, M. Hashim Raza, Malik Zafar and **Abdul Qayyum (2003)**. Evaluation of Concentration of Cardiac Enzymes, Lipids and their Relationship with Myocardial infarction. Published in Proceeding of 7th International Conference on Trends In Biochemistry and Molecular Biology, from April 2-5 2003 pp. 50.
- Muhammad Hashim, S. Yassir Abbas Bokhari, M. Saqib Shahzad, **Abdul Qayyum, M.** Idrees and S. Riazuddin (2003). Detection of GB Virus C/Hepatitis G Virus RNA in Patients with HCV and HBV, Using Nested PCR. Published in Proceeding of 7th International Conference on Trends In Biochemistry and Molecular Biology, from April 2-5 2003 pp. 70.
- Abdul Qayyum Rao**, Tayyab Husnain, Syed Sarfraz Hussain, S. Yassir Abbas Bokhari, M. Hashim Raza, M. Saqib Shahzad and S. Riazuddin (2003). Transformation of Cotton with Phytochrome-B Gene. Published in Proceeding of 7th International Conference on Trends in Biochemistry and Molecular Biology, from April 2-5, 2003, pp. 109.

### **Book Chapter Published:**

- Hussain S.S, **Rao A.Q**, Irfan M and Shi B.J (2020) MicroRNA-mediated regularity functions under salinity stress in plants Book Plant Small RNA Biogenesis, Regulation and Application 415-434 Publisher Academic Press <https://doi.org/10.1016/B978-0-12-817112-7.00019-5>.
- Rao A.Q**, Din SU, Akhtar S, Sarwar MB, Ahmed M, Rashid B, Khan MAU, Qaisar U, Shahid AA, Nasir IA and Husnain T (2016) Genomics of Salinity Tolerance in Plants Book Plant Genomics Publisher InTech <http://dx.doi.org/10.5772/63361>.
- Rao A.Q**, Ali MA, Khan MAU, Bajwa KS, Iqbal A, Iqbal T, Latif A, Shahid AA, Nasir IA and Husnain T (2016) Science behind Cotton Transformation Book Cotton Research Publisher InTech [DOI: 10.5772/64888](https://doi.org/10.5772/64888).
- Latif A, Ahad A, Ahmad M, Akhtar S, Yasmeen A, Shahid A.A, **Rao A.Q**, Nasir I.A and Husnain T (2022) GM Technology and Fiber Traits **published in** Springer Book entitled Cotton Precision Breeding edited by Mehboob-ur-Rahman<sup>1</sup>, Yusuf Zafar<sup>2</sup> and Tianzhen Zhang<sup>3</sup>. <https://www.springer.com/gp/book/9783030645038#aboutBook> ISBN 978-3-030-64503-8.
- Shakoor S, Naeem S, Ramsha, Shahid N, **Rao A.Q** and Shahid AA (2021) Recent Trends in Immunology and Vaccination against New Castle Disease Virus Veterinary pathobiology and public health Unique Publisher.
- Hussain S.S, **Rao A.Q**, Siddique K (2021) Towards Engineering Smart Transcription Factors for Enhanced Abiotic stress tolerance in plants Book Compendium of Plant Genome, Publisher Springer Nature (In review).
- Hussain S.S, Irfan M, **Rao A.Q**, Shi B, Shahid A.A, Siddique K.H.M (2021) Towards redesigning plant photosynthesis using high throughput techniques for enhanced and sustainable food

production under environmental stresses Book Compendium of Plant Genome, Publisher Springer Nature (In review).

### **Thesis Published in Books Form**

- Rao A.Q**, Shahid A.A, Husnain.T (2011) Impact of PHY B Gene Transformation in Physiology and Yield of Cotton LAP Lambert Academic Publishing GmbH & Co. KG ISBN (978-3-8465-0191-7).
- Khan A, Shahid A.A **Rao A.Q** (2011): Epicuticular Wax as a Mechanical Barrier in Transmission of CLCuV VDM Verlag Academic Publishing GmbH & Co. KG ISBN (978-3-639-38065-1).
- Samiullah.T, Ali.F, **Rao A.Q** (2011). Production and Purification of Beta-Glucosidase from Bacillus LAP Lambert Academic Publishing GmbH & Co. KG ISBN (978-3-8465-2634-7).
- Azam. S, Khalid .MZ, **Rao AQ** (2012).Enhanced Biodegradation of para nitrophenol by Pseudomonas Sp. LAP Lambert Academic Publishing GmbH & Co. KG ISBN(978-3-8465-8371-5).
- Muzaffar A, **Rao AQ and Husnain T** (2012) Chloroplast Targeted Expression of Cry1Ac and Cry2A Genes in Cotton LAP Lambert Academic Publishing GmbH & Co. KG ISBN (978-3-659-31158-1)
- Rehman H, Husnain T, **Rao A.Q** (2014) Transformation of RNAi Constructs in different cotton varieties LAP Lambert Academic Publishing GmbH & Co. KG ISBN (978-3-659-48436-0).

### **Curricular Activities**

#### **International Conferences/Seminars/Symposia/Workshops**

- **8 December 2022** Delivered an online lecture to faculty and students at Middle East Technical University (METU) Turkey.
- **13. June 2021** attended and delivered a lecture in two days Conference organized by Technology Center of the **Academy of Sciences of Turkmenistan** Entitled “Science, Technology and Development of Innovative Technologies”, Published a proceeding of abstract Genome editing and genetic modification approaches for crop traits improvement.
- **6-7 October 2021** invited speaker in online symposium **arranged by MPIPZ-LUMS Pakistan Plant Science Symposium Entitled Transgenic/ Genome editing approaches for improvement of important crop traits.**
- **09-12. September 2018** attended 15<sup>th</sup> Biennial Meeting of the DGDR DNA Repair 2018 at **Karlsruhe Germany**
- **07-10. May 2018** act as Resource person in international training workshop organized by SESRIC at **Ankara Turkey.**
- **05-07. April 2017 Rao A.Q, Puchta H (2017)** attended Network Meeting of the Alexander von Humboldt Foundation and presented poster Entitled “CRISPR engineering to knockdown the Begomoviruses CLCuV / ToLCNDV and its insect vector *Bemisia tabaci* **Dresden Germany.**



- **25-28 September 2014**” Rao A.Q, Husnain T (2014) attended ICGI conference and presented “Transformation of different miRNA & RNAi based constructs against CLCuV and its insect vector for the development of virus resistant transgenic cotton **Wuhan China**.
- **26-26 September 2014** Bakhsh A, Ayyaz M, **Qayyum A**, Shahid AA and Husnain T (2014) Insecticidal gene (Cry1Ac) in transgenic Bt cotton under the control of tissue specific promoter (rbcS) exhibits enhanced resistance against Lepidoptera’s. Plant Physiology and Genetics Achievements and Challenges **Bulgaria**.
- **17-22 January 2011**” Workshop training on “Sequencing BY USING 310 Genetic Analyzer” **GENOMED Istanbul Turkey**.  
**5-6 January 2006**: Attended a seminar on “**Environmental management in developing countries**” in **Berlin Germany** InWent gGmbH 2006.
- **27-28 April 2006**: Attended a workshop on “**GMO monitoring**” in Dalhem Berlin in BBA institute.

#### **National Conferences/Seminars/ Symposia/Workshops attended.**

- **January 23, 2023**, Organized One day Awareness seminar on GM Soyabean and potential of Indigenous Soyabean cultivation in Pakistan at CEMB
- **December 14-15, 2022**, Organized Two days International Conference of Plant Molecular Biology (ICPMB) at CEMB.
- **March 22, 2022**, Organized One day seminar Entitled “CEMB Cotton Seminar” held at CEMB.
- **February 23-25, 2022**, Organized a three days’ workshop “Hands on training workshop on structural Bioinformatics Tools” at CEMB.
- **23-24 December 2021** Organized International Symposium on Advances in Molecular Biology of Health and Plants at CEMB.
- **6-7 October 2021** Invited speaker on online symposium MPIPZ-LUMS Pakistan Plant Science Symposium.
- **08 August 2021** attended a Symposium “Entitled Primer designing using Bioinformatic Tools” Online organized by World Forum for Young Scientists.
- **29 July 2021** attended a International Webinar Entitled “Agriculture Nanotechnology Influencing the future of farming sustainability. Organized by the Department of Plant Pathology Faculty of Agriculture Science University of the Punjab.
- **26 July 2021** attended a Seminar “Entitled Minorities in STEM: Barriers they face in academia and pathways to allyship” Online organized by Researchers Academy.
- **15 December 2020 organized** one day symposium Entitled “Development of CKC Technology” at CEMB
- **3 November 2020 Keynote speaker** at One Day Symposium Entitled” CRISPR /Cas Mediated Genome Editing of Plants” held at UVAS Pattoki.
- **20 October 2020** attended One day online Mini Symposium entitled “Food Structure & Functionality” organized by Researcher Academy on Campus.
- **9 September 2020** attended and participated in Virtual Workshop Entitled “Make your Research Life Easier with MENDELEY held at Pakistan Scientific & Technological Information Center (PASTIC)-Peshawar.

- **11-12 December, 2019** attended and participated in National Dialogue Ag-Biotech for Food Security and Capacity Building of Biosafety Regulators held at COMSTECH Islamabad organized by PABIC Lahore.
- **15 November 2019** participated in International Symposium Entitled” Stem Cells and Regenerative Medicine” at CEMB Lahore
- **29-30 April 2019** Organized two days’ workshop “Entitled Hands on Training workshop on CRISPR/Cas Genome Editing Technology” CEMB, Lahore.
- **8-10 April 2019** attended a three days’ workshop Entitled Use of Genome Editing and Other New Breeding Technologies for Global Food Security organized by NIBGE-COMSTECH-ICGEB Islamabad.
- **19-21 December 2018** organized and participated and published in Proceedings of 2<sup>nd</sup> International Symposium on Advances in Molecular Biology of Plants and Health Sciences.
- **7-8 March 2018** participated in 7<sup>th</sup> Invention to Innovation Summit 2015 entitled “Technologies having potential for commercialization” University of the Punjab Lahore
- **21-23 November 2017** organized and participated and published in Proceedings of 2<sup>nd</sup> International Symposium on Advances in Molecular Biology of Plants and Health Sciences.
- **4-5 March 2016** participated in 5<sup>th</sup> Invention to Innovation Summit 2016 entitled “Technologies having potential for commercialization” University of the Punjab Lahore
- **4-5 November 2015** participated in 5<sup>th</sup> Invention to Innovation Summit 2015 entitled “Technologies having potential for commercialization” University of the HariPur.
- **4-5 March 2015** participated in 4<sup>th</sup> Invention to Innovation Summit 2015 entitled “Technologies having potential for commercialization” University of the Punjab Lahore
- **18 November 2015**, Invited Speaker to deliver lecture on “Genetic modification of crop plants” at University of the Central Punjab.
- **23 October 2014**, Invited Guest Speaker for Symposium entitled “How to write research article” organized by Qarshi University Lahore.
- **19-20 March 2014** participated in 3<sup>rd</sup> Invention to Innovation Summit 2014 entitled “Technologies having potential for commercialization” University of the Punjab Lahore.
- **18-19 March 2014** Organizes two days’ workshop entitled “The development and testing of Transgenics for Cotton leaf curl virus (CLCuV) disease resistance” held at Centre of Excellence in Molecular Biology University of the Punjab Lahore.
- **22-25 April 2014** Organizes International Training Workshop entitled “Microarray for Gene Expression” held at Centre of Excellence in Molecular Biology University of the Punjab Lahore.
- **25<sup>th</sup> February 2014** invited Speaker in seminar on Transgenic Plants in perspectives of Microbiological Applications sponsored by the Department of Botany, Lahore College for Women University (LCWU) and the American Society for Microbiology (ASM).
- **18-20 February 2014** invited Speaker in Ist international Conference on Applied Chemical Biological and Aquatic Sciences Government College University Faisalabad.
- **17-18 January 2014** participated in two days online workshop entitled “Managing Academic Thesis for M.Phil-PhD Using End Note, Turnitin and Idea Puzzle” organized by Institute of Research Promotion in collaboration with department of library and information sciences university of the Punjab, Lahore.
- **23-24 September 2013** attended a Symposium as Exhibitor entitled “2-day Vice Chancellors’ Forum on Universities in Islamic World: Challenges of Internationalization.

- **26-28 August 2013** attended training workshop entitled “Cotton Leaf Curl Disease (CLCuD) Diagnostics and Resistance organized by Institute of Agricultural Sciences University of the Punjab for awareness about resistance developed against CLCuD by different modification.
- **25<sup>th</sup> April 2013** attended “DNA Day and NAYS Emerging ideas Conference” held at CEMB to discuss different ideas related to research of molecular biology.
- **9-10 April 2013 2<sup>ND</sup>** “Invention to Innovation Summit” University of the Punjab Display Stall and act as Technology Representor.
- **4-8 March 2013** Act as member of organizing committee of CEMB Sports Gala held at CEMB
- **28 March 2012** Delivered a lecture on Plant Transformation in Seminar entitled “Application of Biotechnology in health and Agriculture” One day Symposium held at GC University Faisalabad.”
- **7 January 2012** attended “2<sup>nd</sup> One day Workshop on Young Researchers, Skill Development and NAYS Emerging Ideas Conference (NAYS-EIC) Organized by National Academy of Young Scientists & Centre of Excellence in Molecular Biology.”
- **19-23 December 2011** Serve as **Resource Person in Training Course Entitled “Advances in Application of Molecular Biology Organized by Centre of Excellence in Molecular Biology”**
- **25-26 May 2011** “1st National Conference on Setting Standards for 21st Century Pakistan” Serena Hotel Islamabad arranged by HEC.
- **21-23 December 2010** “International Symposium on Biotechnology Applications in New Emerging Fields” Allama Iqbal Medical College Lahore
- **12th November 2010** “Research management” in collaboration with HEC Quality Enhancement Cell and institute of Quality and Technology Management University of the Punjab.
- **1-2 October 2010:** Two days Intensive Course on Research Paper Writing at IB&M, UET, Lahore
- **25<sup>th</sup> June 2010** “Research workshop on writing of research proposal” at National Institute of Biotechnology and Genetic Engineering (NIBGE).
- **24-28 March 2008:** National Bioforum 2008 organized and attended symposia regarding Molecular Biological Research, siRNA technology as therapeutic tool and A Workshop on regulation of use of GM crops. Bioforum was organized in National Centre of Excellence in Molecular Biology, Lahore, Pakistan.
- **23rd July 2007:** Mini symposium on new vistas of Plant and Medical Molecular Biology. Organized and attended the symposium which included the lectures about new vitas of plant Molecular Biology and Stem cell therapy in National Centre of Excellence in Molecular Biology, Lahore, Pakistan.
- **16-17 July 2007:** Eighth Training Workshop on Crime Scene Research and Modern Forensic Techniques for Crime Investigation, National Centre of Excellence in Molecular Biology, Lahore, Pakistan
- **14-19th Nov 2005:** Pre 18th FAOBMB Symposium Satellite Workshop on Bioinformatics. Organised and attended the workshop which includes lectures and hands on practical, organized by National Centre of Excellence in Molecular Biology (NCEMB), University of the Punjab, Lahore. Pakistan with the international collaboration of **FAOBMB, ISCB, S\*Alliance.**
- **April 2-5 2003:** Attended 7<sup>th</sup> International Conference on Trends In Biochemistry and Molecular Biology held at University of the Punjab Lahore Pakistan.

### Extra-Curricular Activities

- 2013 Organizer of Sports Gala in CEMB University of the Punjab
- 2005 involved in four Month Management course in Germany.
- 1993-4 **National Cadet Corpse training** at Govt. Islamia College Khanewal.
- 1992 till date Played Cricket at School, College, and University Level

### **Thesis/Research Supervised**

#### **PhD Thesis Supervised/Under process:**

1. Genetic Improvement of cotton for weedicide and bollworm Tolerances (Agung Nughro Puspito). CEMB, University of the Punjab. **Completed December 2015**
2. Characterization of wax for their role as physical barrier in transmission of CLCuV in Cotton. (Muhammad Azmat Ullah Khan) CEMB, University of the Punjab. **Completed December 2015**
3. Development of vaccine against Pakistani strain of NDV in Corn (Naila Shahid) CEMB, University of the Punjab Lahore Pakistan. **Completed December 2017**
4. Characterization, Cloning and Expression of new Bt gene in Cotton (Salahuddin) CEMB, University of the Punjab Lahore Pakistan. **Completed February 2019**
5. Development of Insect Resistance in Plants by altering the amino acid content in sap (Ambreen Gul) CEMB, Uni. of the Punjab Lahore Pakistan. **Completed November 2019**
6. Transformation of Fibre Elongation and Anti Senescence genes in Cotton (Ayesha latif) CEMB, University of the Punjab Lahore Pakistan. **Completed December 2020**
7. Combinational Approach to Develop Broad Spectrum Resistance in Cotton Against Insects (Saira Azam) CEMB, University of the Punjab Lahore Pakistan. **Completed October 2022**
8. Cas9 Mediated gene knock down of vacuolar Invertase (VInv) gene of *Solanum tuberosum* to reduce tuber sweetening during long term storage (Aneela Yasmeen) CEMB, University of the Punjab Lahore Pakistan. **Completed October 2022**
9. Expression of Haemagglutinin HA gene in Maize for production of edible vaccine against avian influenza virus (Tahir Rehman Samiullah) CEMB, University of the Punjab Lahore Pakistan. **Thesis Submitted (Session 2017-2021)**
10. CRISPR/Cas9 Multiplex based genome editing of Virus (CLCuV) through an Endogenous tRNA-Processing System (Sana Shakoor) CEMB, University of the Punjab Lahore Pakistan. **Completed (Session 2018-2022)**
11. CRISPR/Cpf1 multiplex based knockout of CLCuV to circumvent cotton leaf curl disease. (Sara Ajmal) CEMB, University of the Punjab Lahore Pakistan. **(Session 2019-2023)**

#### **Master of Philosophy (M.Phil.) Thesis Supervised:**

- 1- 2010: Role of epicuticular waxes in the susceptibility of *Gossypium arboreum* cotton to CLCuV (Muhammad Azmat Ullah Khan) CEMB, University of the Punjab Lahore.
- 2- 2012: Cloning and Chloroplast Expression of Cry1Ac and Cry2A Transit Peptide Fusion Genes in Cotton Variety MNH-786 (Adnan Muzaffar) CEMB, University of the Punjab Lahore.
- 3- 2012: Transformation of Insect resistant and Herbicide tolerant Genes in Cotton Variety MNH-786 (Adil Abbas) CEMB, University of the Punjab Lahore.
- 4- 2012: Transformation of Cotton Variety MNH-786 with Multiple Genes (Mudasar Fareed)

- CEMB, University of the Punjab Lahore.
- 5- 2012: Transformation of Multiple Genes in Cotton Variety VH-289 (Naila Shahid) CEMB, University of the Punjab Lahore.
  - 6- 2012: Transformation of fibre related gene in Cotton Variety MNH-786 (Sidra Akhtar) CEMB, University of the Punjab Lahore.
  - 7- 2013: Transformation of RNAi construct into different cotton varieties to control CLCuV (Habibur Rehman) CEMB, University of the Punjab Lahore.
  - 8- 2014: Expression of insect and virus resistant genes in transgenic cotton variety VH-289 (Adnan Iqbal) CEMB, University of the Punjab Lahore.
  - 9- 2014: Transformation of Bleaching Herbicide Resistant *Hydrilla verticillata* pds gene in Cotton Variety CEMB-33 (Muhammad Azam) CEMB, University of the Punjab Lahore.
  - 10- 2014: Detection and Localization of Bt genes in *Gossypium hirsutum* by in Situ Hybridization (Shaista Rubab) CEMB, University of the Punjab Lahore.
  - 11- 2015: Expression, Purification and Bioinformatics Analysis of NDV Capsid Proteins (Sana Tahir) CEMB, University of the Punjab Lahore.
  - 12- 2015: Transformation of siRNA-based constructs (Wf1& VB) in cotton variety (*Gossypium hirsutum*) VH-289 (Aftab Ahmad) CEMB, University of the Punjab Lahore.
  - 13- 2015: Transformation of *Calotropis procera* plasma membrane intrinsic protein 2 gene in *Gossypium arboreum* FBD1 for fiber improvement. (Hafsa Amaturasul) CEMB, University of the Punjab Lahore.
  - 14- 2016: Genetic modification of *Gossypium arboreum* for herbicide tolerance and improved insect resistance, (Muhammad Sufyan Tahir) CEMB, University of the Punjab Lahore.
  - 15- 2016: Cloning and Transformation of F3'5'H gene in Cotton under fiber specific promoter. (Nadeem) CEMB, University of the Punjab Lahore.
  - 16- 2016: Co-Expression of Carboxysomal Proteins, (Huma Shakoor) CEMB, University of the Punjab.
  - 17- 2017: Expression of *Oryza sativa* Aspartate Aminotransferase gene in cotton *Gossypium hirsutum* to control sucking insects (Ghulam Hussain) CEMB, University of the Punjab.
  - 18- 2017: *E.coli* Expression of HA gene of H9N2 Influenza Virus (Sana Shakoor) CEMB, University of the Punjab.
  - 19- 2017: Overproduction of methanol through expression of PME genes in cotton to control insects (Marukh Zubair) CEMB, University of the Punjab.
  - 20- 2017: Enrichment of Anthocyanin pigments in Cotton fiber by the expression of ROS1/DEL and LC genes (Ujala Nasir) CEMB, University of the Punjab.
  - 21- 2018: Development of Rice *Tungro Bacilliform* virus driven phloem specific defence system against whitefly in *Gossypium hirsutum* (Mujahid Hussain) CEMB, University of the Punjab.
  - 22- 2018: Establishment of a phloem specific Cas9 based resistance mechanism against *Bemisia tabacci* in cotton plant (Maryam Maqsood) CEMB, University of the Punjab.
  - 23- 2018: Generation and analysis of cotton plant with a constitutive Cas9 based resistance mechanism against *Bemisia tabacci* (Maryam Abid) CEMB, University of the Punjab.
  - 24- 2018: Testing a Cas9 mediated in *Planta* defence strategy against CLCuV in *Gossypium hirsutum* (Momal Maqsood) CEMB, University of the Punjab.
  - 25- 2019: Testing of CLCuV genome knockout and whitefly mortality mechanism through use of mutated Cas9 in genome edited transgenic cotton plants (Sahar Sadaqat) CEMB, University of the Punjab.
  - 26- 2019: A Combinational Approach to Combat Insects Through Next Generation Bt and Plant Lectins (Mohsin Shad) CEMB, University of the Punjab.
  - 27- 2019: Testing a Cas9 mediated in *Planta* Knockout of fiber related genes in cotton (*Gossypium hirsutum*) (Gulzaib) CEMB, University of the Punjab.
  - 28- 2019: Expression of F and HN protein gene in maize against NDV genotype VII (Hafiza Ayesha Malik) CEMB, University of the Punjab.

- 29- 2019: Development of polyclonal antibody against NDV F protein expressed in *E. coli* and its application as conjugate for Nanoparticles (Maira Zahid) CEMB, University of the Punjab.
- 30- 2020: Cell Mediated Immune study of plant-based vaccine against NDV genotype VII (Sana Tanveer) CEMB, University of the Punjab.
- 31- 2020: CRISPR/Cas9 based knockout of CLCuV DNA  $\beta$  replication region (Tajamal Hussain) CEMB, University of the Punjab.
- 32- 2020: Transformation of Cry1Ac and Cry2A under tissue specific promoters in Cotton CEMB-0 (Fida) CEMB, University of the Punjab.
- 33- 2020: Generation of Transgenic cotton plants resistant to CLCuV through knocking out of  $\beta$  C1 and its intergenic region (Wazila Riaz) CEMB, University of the Punjab.
- 34- Development of next generation herbicide resistant cotton through transformation of dicamba methyl ester gene in cotton (Syeda Samra Imran) CEMB, University of the Punjab.
- 35- 2021: Characterization of DICAMBA Transgenic Cotton Plants through Molecular analysis and Assessment of their Herbicide Resistance for Advance Generation. (Muhammad Waseem) Botany, University of the Punjab.
- 36- 2021: Development of Cas9 mediated in planta knockout of Phy-A protein gene in potato. (Saania Amjad) CEMB, University of the Punjab.
- 37- 2021: Engineering of Algal Chloroplast for Mucosal Immunotherapeutic against NDV. (Sania Naeem) CEMB, University of the Punjab.
- 38- 2021: Combinational Approach of Fern Chitinase like Protein and Cas9 based Resistance in Cotton against *Bemisia tabaci* (Ramsha) CEMB, University of the Punjab.
- 39- 2021: Cloning and Expression of Cry1Fa gene in cotton to confer resistance against insects. (Aqsa Yasin) CEMB, University of the Punjab.
- 40- 2021: Transformation of Cry1ab gene in Cotton to Combat Pink Bollworm Infestation. (Faiza Nasir) CEMB, University of the Punjab.
- 41- 2021: Genetic Transformation Of *Gossypium arboreum* (IDC-I) For Fiber Improvement and Resistance against Biotic Stresses (Noman Nazik) CEMB, University of the Punjab.
- 42- 2021: CRISPR Cas13D Multiplex based knock out of PVX and PVY in Potato (Momina Muhammad) CEMB, University of the Punjab.
- 43- 2022: knocking out the disease susceptible endogenous genes (LOV1 and AOS2) by using CRISPR-Cas9 technology (Muhammad Awais) CEMB, University of the Punjab.
- 44- 2022: CRISPR/Cas9 based knockout of PhyA in Cotton to improve physiology (Abdul Rauf) CEMB, University of the Punjab.
- 45- 2022: Editing of TT12 gene of cotton imparts white appearance (Mehwish Imtiaz) CEMB, University of the Punjab.
- 46- 2022: *E. coli* Expression of Fusion gene for its toxin dose adjustment (Arzoo Ishaq) CEMB, University of the Punjab.

**BS Hons Thesis Supervised:**

1. 2010: PCR based detection of transgenic cotton plants (Ms. Bushra) Kinard College.
2. 2010: Protein based detection of transgenic cotton plants (Ms. Tahira) Kinard College.
3. 2010: Post market monitoring of GMO foods in Lahore Super markets (Uzma Murad) Environmental Sciences University of the Punjab.
4. 2011: Molecular Techniques for detection of CLCuV (Mr. Aurangzeb) BZU Multan.
5. 2013: TA Cloning of Cry2Ac gene in *Escheria coli* (Samra Ramzan) IAGS, University of the Punjab.
6. **2013:** Molecular Evaluation of Triple Gene Transgenic Cotton (Tehmina Tufail) IAGS, University of the Punjab.

7. **2014:** Temporal Expression of Bt gene in cotton variety CIM 482 (Mrs. Anam (Internship) Kinard College Lahore.
8. **2014:** Temporal Expression of Bt gene in cotton variety VH-281 (Mrs. Maryam (**Internship**) Kinard College Lahore.
9. **2015:** Isolation of Aspartate Aminotransferase gene from *Oryza sativa* (Sheeza Akhter) Kinard College Lahore.
10. **2015:** Confirmation of transformation of Cathepsin B gene against whitefly in *Gossypium hirsutum* Kinard College Lahore.

### **External Mentoring at University Level**

<b>Thesis Evaluated</b>	<b>Level-Department</b>	<b>University</b>	<b>Year</b>
01	M.Phil-Environmental Science	Punjab	2011
03	BS Hons and M.Phil-MMG	Punjab	2012
01	M.Phil-IAGS	Punjab	2012
02	M.Phil Botany	Baluchistan	2012
02	M.Phil Biotechnology	FC University Lahore	2013
01	M.Phil MMG	Punjab	2013
01	M.Phil IAGS	Punjab	2013
01	M.Phil Chemistry	SBK Women University	2013
03	M.Phil Bioinformatics	GC University Faisalabad	2013
03	M.Phil Biotechnology	FC University Lahore	2014
01	M.Phil MMG	Punjab	2014
01	M.Phil Molecular Biology	University of Lahore	2014
01	PhD Botany	University of Baluchistan	2014
01	M.Phil	University of the Lahore	2015
01	MSc	MMG University of the Punjab	2015
02	M.Phil MMG	Punjab	2016
01	M.Phil	University of Lahore	2016
01	M.Phil	University of Sargodha	2016
01	PhD	University of Baluchistan	2017
02	M.Phil	FC University Lahore	2018
07	M.Phil	University of Lahore	2019
01	M.Phil	FC University Lahore	2019
02	M. Phil	University of the Central Punjab	2020
02	BS	FC University Lahore	2021
02	PhD	University of Sindh	2021
01	PhD	LUMS	2021
02	M.Phil	FC University Lahore	2022
02	M.Phil	GC University Faisalabad	2022
02	M.Phil	Education University Lahore	2022
01	PhD	UVAS Lahore	2023

### **Language Proficiency**

- **English:** Expert in written & verbal communication
- **German:** Basic Knowledge in written & verbal communication
- **Arabic:** Basic knowledge in written & verbal communication

### **Research visits:**

- 1. Visited DSMZ Braunschweig Germany from October 2005 to October 2006 for one year training on “Development oriented Plant biotechnology and Biosafety”** The research project was “Chemical characterization of silencing protein in plant virus in virus disinfection”.
- 2. Visited GENOMED Istanbul Turkey for Eight days from (16/01/2011 to 23/01/2011) Training on Sequencing BY USING 310 Genetic Analyzer”.**
- 3. Visited China Wuhan Agriculture University from September 23-October 02, 2014** for exchange of knowledge and also for presenting abstract in ICGI meeting.
- 4. Visited Ankara Turkey in March 29-31, 2016, as Resource Person** to trained Peoples from Islamic countries on Cotton Biotechnology Organized by SESRIC.
- 5. Visited Botanische Institute KIT Germany as Senior Researcher (Humboldt Fellow) November 2016-October 2017** to work on project “CRISPR engineering to knockdown CLCuV/ToLCNDV and its insect Vector Whitefly.
- 6. Visited Ankara Turkey in May 07-10, 2018, as Resource Person** to trained Peoples from Islamic countries on Cotton Biotechnology Organized by SESRIC.
- 7. Visited Botanische Institute KIT Germany as Senior Researcher (Humboldt Fellow) May 2018-November 2018** to work on project “CRISPR engineering to knockdown CLCuV/ToLCNDV and its insect Vector Whitefly.
- 8. Visited Azerbaijan 21-27 May 2022 for Diagnostic Mission** of IsDB Reverse Linkage Project for Cotton Improvement and Transfer of Technology.
- 9. Visited Azerbaijan 23-29 August 2022 for Validation Mission** of IsDB Reverse Linkage Project for Cotton Improvement and Transfer of Technology.

### **National and International Collaborations**

- |                                 |   |
|---------------------------------|---|
| 1. Prof. Dr. Holger Puchta      | Head Molecular and Biochemistry<br>KIT Germany  |
| 2. Prof. Dr. Mark Tester        | Professor and Associate Director<br>Centre for Desert Agriculture<br>KAUST Saudi Arabia.      |
| 3. Prof. Zhang Rui              | Biotechnology Research Institute<br>Chinese Academy of Agriculture<br>Sciences, Beijing China |
| 4. Prof. Khalid Mahmood Khawar  | Faculty of Agriculture University<br>of Ankara Turkey   |
| 5. Dr. Khurram Bashir           | Riken Yokohama Campus Japan The<br>University of Tokyo  |
| 6. Prof. Dr. Syed Sarfraz Ahmad | FC University Lahore  |
| 7. Prof. Dr. Ali Shah           | Chairman Pathobiology Department<br>Arid Agriculture Rawalpindi                               |
| 8. Dr. Shahzad Awan             | CEO ZS Biotech Lahore   |



## **References**

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