Curriculum Vitae

Prof. Dr. Ahmad Ali Shahid

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Centre of Excellence in Molecular Biology,
University of the Punjab, Thoker Niaz Baig
Lahore, Pakistan.

Faculty Position: ***Professor (BPS-21)***

Education

- **Post Doctorate**
  (2006-2007) Characterization of Abscission Related Genes of *Arabidopsis thaliana*.
  The University of Nottingham, UK.

- **Ph.D.** Molecular Biology
  (2004) Production of Phytotoxins from *Ascochytarabiei* and
  Molecular Studies of Defence Genes in Blight Infected Chickpea.
  CEMB, University of the Punjab, Lahore, Pakistan

- **M.Sc. (Hons.)** Plant Pathology
  (1988) Effect of Root-knot Nematode (*Meloidogyne spp*.) on Nodulation and Development of Chickpea (*Cicerarietinum L*.).
  University of Agriculture Faisalabad, Pakistan

- **B.Sc. (Hons.)** Plant Pathology
  (1986) University of Agriculture Faisalabad, Faisalabad, Pakistan

Awards and Honours

- Certificate of Honour for outstanding contribution as Reviewer of the International Agricultural Science Congress held in Van-Turkey, May 9-12, 2018.
- PCST Research Productivity Award 2016-17, Scientific Id # 3018
- PCST Research Productivity Award 2015-16, Scientific Id # 3018
- PCST Research Productivity Award 2014-15, Scientific Id # 3018.
- Incentive Award on Research Publications with 3rd position in Punjab University during 2016.
- Performance Evaluation Award with 90.67 percent during 2016 from University of the Punjab.
- Performance Evaluation Award with 85.33 percent during 2015 from University of the Punjab.
- Performance Evaluation Award with 76.67 percent during 2014 from University of the Punjab.
- Performance Evaluation Award with 88 percent during 2013 from University of the Punjab.
- Post Doctorate Fellowship awarded by Higher Education Commission completed at Plant Science Division, School of Biosciences, University of Nottingham UK for one year (November 2006 to October 2007).
- Member Board of Faculty of Science, Punjab University, Lahore (1999 to 2000 and 2013-todate).
- The certificate of accomplishment for maintaining an excellent record of results and data books, CEMB (1997).
- Faculty member of Biology Department, University College London, U.K for nine months (September 1990 to May1991).
- Rotary club merit scholarship in B.Sc and M.Sc (1984 to 1988).
- Merit Scholarship in Middle and Matric from Sargodha Board (1977 and 1979).

PATENT:

A patent application No. 172/2015 filed dated 24th March, 2016 entitled "Development a Process of PCR Multiplex System for the Simultaneous Detection of Conventional STRs, MiniSTRs and Y-STRs.

TEACHING EXPERIENCE

COURSES TAUGHT

- Plant Molecular Biology
- Biotechnology
- Advances in GMOs Detection
- Plant Nematology

- Advances in Plant Pathology
- Introduction to Molecular Plant Pathology
- Molecular Plant Microbe Interaction
- Agriculture Biotechnology

Research Theses Supervised

Ph. D (Supervised):

I. Ibrahim Bala Salisu (2019), "Nutritional Assessment of Recombinant Plant DNA and Transgenically Expressed proteins on Different Biological Functions of Albino Rats".
II. Mukhtar Ahmed (2019), "Cloning and Transformation of sucrose synthase (*SuS*) gene in cotton (*Gossypium hirsutum L.*).
III. Sidra Akhtar (2019) "Expression of Bacterial Cellulose Synthase gene in cotton".
IV. Muhammad Ali, (2019) "Biological control of damping off disease of chillies".
V. Kiran Nawaz (2018), "Isolation and characterization of glucanase genes from *Trichoderma* and their evaluation against root rot of chili".
VI. Sehrish Iftikhar (2018), "Computer aided design of fungicides to combat early blight of potato".
VII. Rukhsana Parveen (2018), "Forensic and Phylogenetic characterization of Pakistani Populations using uniparental and biparental Genetic Markers".
VIII. Asma Ibrahim (2017), "Genomic diversity of root-knot nematodes and development of induce systemic resistance (ISR) against *Meloidogyne incognita* in vegetables".
IX. Inayat Ullah (2017), "Molecular characterization of retinal disorders in Pakistani families".
X. Waheed Anwar (2017), "Isolation and characterization of entomopathogenic fungi and their evaluation against *Bemisia tabaci*".
XI. M Aleem Ashraf (2015), "Expression of Insecticidal Gene under Cotton Leaf Curl Virus (CLCuV) Promotor in Cotton".
XII. Azmat Ullah Khan (2015), "Characterization of Epicuticular Wax for their Role as Physical Barrier in Transmission of CLCuV in Cotton".
XIII. Mian Sahib Zar (2014), "Comparative Analysis of STRs, mini – STRs and SNPs for Typing Degraded DNA".
XIV. Kamran Shahzad (2013), "Transformation of Fiber Related Genes in Cotton (*Gossypium hirsutum*)".
XV. Muhammad Israr (2013), "Genetic Characterization of Chr Xmini STRs in Pakistani Population".

Ph. D (In Progress):

- ❖ Ruqeyah Abdul Majeed, "Antifungal potential and phytochemical analysis of medicinal plants against Brown spot disease of rice". *Thesis submitted.*
- ❖ Abida Shehzadi, "A new PCR Multiplex Assay Development for the Simultaneous Detection of Autosomal, Y-Chromosome and X-STR Loci".
- ❖ Saliha Bashir, "Prediction of Phenotype Using SNP Base Multiplex System In Pakistani Population"
- ❖ M Azam Ali," Transformation of Arbidopsis CER3 gene to study its role against various stresses in cotton".

M. Phil (Supervised):

1. Muhammad Awais Riaz (2019), "Characterization of Fusarium oxysporum and its Inhibition by Different Plant Extracts and Essential oils".
2. Farhan Ali (2019), "Molecular Characterization of Alternaria solani and its Biological Management".
3. Amna Sajid (2019), "Prediction of Fingerprint Patterns through SNPs analysis in Pakistani population".
4. Muhammad Asim Javed (2019), ''Assessment of wheat (*triticum aestivum* l.) Associated microbiomes and their impact on plant health''.
5. Muhammad Usman (2019), "Evaluation Of Transgenic Cotton Using Molecular Biology Techniques".
6. Ayesha Liaqat, (2019), "Effect of transgenic maize harboring binary insect resistance genes the Cry1Ac and Cry2A on fertility related genes expression by using Wistar rats".
7. Bakhtawar Javaid Piracha (2019), "Forensic Genetic Analysis of 11 Rapidly Mutating Y- STRs (RM-YSTRs) in Sindhi Population of Pakistan".
8. Rida Sadaqat (2018), "Enhanced production of methanol and BT protein in *Gossypium hirsutum* (CEMB-88) to control insect pests".
9. Farwa Akhlaq (2018), "Toxicological assessment of chronic feeding of transgenic cotton seed meal in albino rats".
10. Samia Saleem (2018), "Haplotype diversity of 17 Y-chromosomal STRs in Christian population of Pakistan".
11. Aqsa Rubab (2018), "Forensic genetic evaluation of 15 autosomal STRs in Christian population of Pakistan".
12. Asma Chaudhry (2018), "Detection of antimicrobial protein from *Bacillus pumilus* and their potential against *Fusarium oxysporum*".
13. Iqra Ashraf (2018), "Isolation and Purification of Antifungal proteins from *Coriolus versicolor* against Early Blight of Tomato".
14. Qasim Ali (2017), "Biosafety assessment of transgenic cotton harboring the Cry1Ac, Cry2A and CP4 EPSPS genes by using Sprague Dawley rats".
15. Saima Amin (2017), "Risk Assessment of Transgenic Cotton (Vh289) Harboring Cry1ac, Cry2a and Cp4 Epsps Genes on Soil Microbes and Wild Plants".
16. Hira javed (2017), "Polymorphism Studies of Se33 Locus in Pakistani Population and Development of its Allelic Ladder with New Variant Alleles".

17. Noshaba Rani (2017), “Polymorphism Studies of 10 Mini STRs in Arayin Ethnic Group of Punjab Pakistan”.
18. Sumbal (2017), “A Novel Multiplex Assay of 12 Rapidly Mutating Y-Strs to Discriminate the Male Individuals of Shared Paternal Lineage”.
19. Maria Khan (2017), “Molecular Analysis and Field Evaluation of Transgenic Cotton for Its Resistance Against Chewing Insects”.
20. Aqsa Riaz (2017), “Molecular Evolution of Transgenic Cotton Plants against CLCuV in advance Generation”.
21. Muhammad Ahmad (2017), “Biological Control of Pythium aphanidermatum in Chili with the Application of Plant Growth Promoting Rhizobacteria and Ganoderma lucidum Extract”.
22. Misbah Abbas (2017), “Influence of some Antagonistic Bacteria against Early Blight (Alternaria Solani) of Tomato (Lycopersicon esculentum) in Laboratory & Field conditions”.
23. Nadeem Anjum (2017), “Antimycotic Effect of Trichoderma species on Fusarium oxysporum f.sp. Capsici inciting vascular wilt in chili”.
24. Aleena Khalid (2016), “Correlation between Beta satellites and Cotton Leaf Curl Virus (CLCuV) In Transgenic Cotton”.
25. Tahira Haider (2016), “Analysis of Fish (*Labeo rohita*) for Harmful Efffect of Bt and Glyphosate Tolerant Protein by Feeding Transgenic Cotton”.
26. Tayyba Chaudhry (2016), “Antagonistic effect of different Bio-control agents against fungal pathogens of *Solanum melongena*”.
27. Sehar Naz (2016), “Comparative antimicrobial activity of biological control agents against *Fusarium solani*”.
28. Farhana Asghar (2016), “Antifungal evaluation of various biological extracts against early blight of potato”.
29. Gulraiz Ahmad Liaqat (2016), “Morpho-molecular characterization and biological control of foliar fungal pathogen of rice”.
30. Maryum Munir (2016), “Molecular analysis and Whitefly feeding assay to check efficacy of siRNA based constructs against whitefly and virus”.
31. Muhammad Asif (2015), “Antifungal Potential of *Ganoderma luciduma* gainst plant pathogenic fungi isolated from from *Calendula officinalis* (marigold) and *Oryza sativa* (rice)”.
32. Amina Yaqoob (2015), “Risk assessment of Bt crops in non-target plant growth promoting Rhizobacteria (PGPR)”.
33. Hasib AamirRiaz (2015), “Genetic association analysis of the maoa-uvntr and 5httlpr, candidate genes for aggression in maltreated individuals”.
34. Tiyyabah Khan (2015), “Management of aflatoxigenic *Aspergillus spp*. and their insect vectors in stored wheat, using biorational insecticides.”
35. Umama Ali (2015), “Development of infectious clones and RNAi construct for tomato leaf curl new Dehli virus (ToLCNDV)”.
36. FaizaMehmood (2015), “Biosafety study of transgenic cotton plants resistant to cotton leaf curl virus (ClCuV)”.
37. MehraAzam (2015), “Molecular identification and phylogeny of *Aspergilus*and *pencilium* isolates from apple and citrus”.

38. Amna Tahir (2015), “Biosafety studies and detection of viral particles in insect resistant transgenic plants”.
39. Rabia Ashraf (2015), “Evaluation and biosafety studies of glyphosate tolerant transgenic cotton plant”.
40. Syeda Shaista Rubab, (2014), “Detection and localization of Bt genes in *Gossypium hirsutum* by in situ hybridization”.
41. Muhmmad Shakil Shaukat, (2014) “Molecular characterization of triple gene transformed cotton (*Gossypium hirsutum L.*)”.
42. Hina Shanakhat (2014), “Isolation and molecular characterization of mycoflora from stored rice grains”.
43. Aisha Javed (2014), “Management of Fusarium wilt of tomato by Biological and Chemical strategies”.
44. Ayesha Majeed (2014), “Cloning and Optimization of expression of chitinase 2a gene of barley”.
45. Wajeeha Tariq (2014), “Mechanism and Efficiency of Bacillus strains to induce systematic resistance in tomato plants against Fusarium wilt”.
46. Muhammad Atif (2013), “Biological Control of Root – Knot Nematode (Meloidogyne sp.) in eggplant through bacterial strains & expression profile analysis of leucine rich gene(s)”.
47. Mirza NabeelBaig (2013), “*Ganoderma lucidumas* biological control agent against different plant pathogenic fungal and bacterial species”.
48. SyedaIram Jafri (2013), “Defense induction on tomato of rot knot nematode (*M. incognita*) by chitinase producing bacteria and expression of Mi gene”.
49. H. Khadija Sabir (2013), “Amplification and sequencing of class II chitinase gene 2a, 2b of different barley cultivars”.
50. Memoona Naseer (2013), “Influence of weed extracts on charcoal rot of sun flower and soil beneficial microflora”.
51. Anam Usmani (2013), “Evaluation of weed extracts in nitrification inhibition, stem rot suppression and yield enhancement of maize”.
52. Ruqeyah Abdul Majeed (2013), “Morphological and molecular characterization of curvularia sp. Isolated from rice”.
53. Muhammad Umer (2013), “Isolation and screening of rhizobacteria for bio control activity against Fusarium wilt and Charcoal rot of chillies”.
54. Hafiz Husnain Nawaz (2013), “Screening, characterization and bio control potential of entomopathogenic fungi against different crop pests”.
55. Maryam Noreen (2013), “Comparative studies of ClCv resistant transgenic cotton (SiRNA) of variety MNH-786”.
56. Sadia Bano (2013), “Risk Assessment Studies of Bt Protein on Animals”.
57. Sidra Akhtar (2012), “Agrobacterium Mediated Transformation of *Calotropisprocera* fiber gene in Cotton”.
58. Memona Imran (2012), “Risk Assessment Studies of Transgenic Cotton on Chicks.”
59. SairaAyuab (2012), “Biocontrol of soft rot of potato by using rhizobacteria”.

60. SehrishIftikhar (2012), "Essential oil and latex as novel antiviral agents and monitoring of antimicrobial activity using molecular markers".
61. Asma Ibrahim (2011), "Studies on Biological Control of Root Knot nematodes (*M. incognita*)".
62. Ayesha Umeera (2011), "Phytochemical Investigation of Ajivain and Klovinji".
63. Azmat Ullah Khan (2011), "Role of Epicuticular Waxes in the susceptibility of *Gossypium arboreum* cotton to CLCuV".
64. Muhammad Afzal (2011), "A Tool for recondiary Structure Determination and Analyzing DNA".
65. Sana Khalid (2009), "Effect of *Bt* crop on animals (Gossypium hirsutum)".
66. Noor Muhammad (2007), "Inheritance and biosafety studies of Bt. Transgenic Basmati Rice".
67. Saima Siddique (2007), "Isolation and cloning of fructose – 1, 6 – Bisphosphate aldolase from *Arabidopsis thaliana* to a plant expression vector".
68. Abdul Sattar (2002), "Isolation and identification of virulent factors from entomopathogenic fungi".
69. Muhammad Tariq (2000), "Isolation and characterization of different isolates of *Metarhizium anisoplea* from local environment".

M. Sc/B.Sc. (Hons.) Internship Supervised:

1) Sofia Shafi, (2019) "Comprehensive study of Molecular Techniques for The Development of Transgenic Cotton to improve Fiber contents"
2) Mahnoor Tahir Baig, (2019) "Comprehensive study of Molecular Techniques for The Development of Transgenic Cotton to improve Fiber contents"
3) Umme Moniba, (2019) "Comprehensive study of Molecular Techniques for The Development of Transgenic Cotton to improve Fiber contents"
4) Anam Rashid (2018), "Molecular study and analysis of transgenic cotton against attack of cotton leaf curl virus".
5) Ramsha Basit (2018), Molecular techniques for the development and confirmation of transgenic cotton against CLCV.
6) Aneeza Nasrullah (2018), "Molecular analysis of transgenic cotton plants against CLCV".
7) Andleeb Zulfiqar (2016), "Bio chemical and molecular characterization of bacterial isolates from vegetable fields".
8) Iqra Ashraf (2016), "DNA finger printing of bacterial blight resistant Genes Xa21 in Rice".
9) Maria Illyas (2016), "Molecular dissection of Bacterial leaf Blight Resistant Xa4 Genes in Rice".
10) Ansar Ali (2016), "Molecular analysis of transgenic desi cotton".
11) Misbah Abbas (2015), "Pathogen detection, gene transfer, insect rearing and diet assay".

12) NidaRafaqat (2015), “Cloning of cotton leaf curl disease associated begomavirus and satellite molecules”.
13) Aqsa Riaz (2015), “Cloning of cotton leaf curl disease associated begomavirus and satellite molecules”.
14) Sonia Sahar (2014), Detection of cotton leaf curl virus through PCR and Southern blot techniques.
15) Tayyba Ch., (2014), The use of PCR and Southern blot techniques for detection of cotton leaf curl virus.
16) Umama Ali (2013), Fungal growth in open storage conditions at packages centers and their loses with respect to paper industry.
17) KomalHanif (2013), Isolation and identification of fungal disease on corn plant and their effect on farming community in relation packages biomass project
18) Muhammad Asif (2013), Pest Diagnostic Techniques, Their Control and Pesticides Quality Maintenance.
19) Mehra Azam (2013), Genomic approaches for study of abiotic stress in cotton plants.
20) Maryam Munir (2013), Agrobacterium mediated transformation in cotton.
21) Mamoona Asif (2013), Agrobacterium mediated transformation in cotton.
22) Samra Ramzan (2013), TA cloning of Cry 2A gene in Escherichia coli.
23) Sidra Meraj(2013), Evaluation of CEMB Bt cotton lines by ELISA & PCR.
24) Samar Batool (2013), Evaluation of CEMB Bt cotton lines by ELISA & PCR.
25) TehminaTufail (2013), Molecular evaluation of triple gene transgenic cotton.
26) Gulshan Nazir (2012), Soil and water analysis techniques for crop production.
27) Madiha Munir (2012), Soil and water analysis techniques for crop production.
28) Aysha Javed (2012), Isolation of Bacillus species from soil and evaluation for antifungal activity against Fusariumoxysporum.
29) Hina Shinakhat (2012), Isolation of Bacillus species from soil and their antifungal activity against Aspergillusniger.
30) Rabia Afzal (2012), Isolation of Bacillus species from soil and their biocontrol against Alternariaalternata.
31) Anam Shakir (2012), Isolation and molecular characterization of Saline soil bacteria.
32) Ayusha Sharif (2012), Isolation and molecular characterization of Saline soil bacteria.
33) TehminaBahar (2012), Isolation and molecular characterization of Saline soil bacteria.
34) Rida-e-Fatima (2012), Isolation and molecular characterization of Saline soil bacteria.
35) Rabbia Bukhari (2012), Study of efficiency of different concentration of pesticides on white fly at cotton and pumpkin crops.
36) Rabia Iqbal (2011), Sprinkler Irrigation System; A water efficient and disease controlling approach to crop production.

Research Highlights

2010-to date:

Physiological improvement of cotton crop improvement against Virus and Abiotic stresses:

The cotton industry is challenged with problems in cost of production and requirements for high quality in the product. But cotton production in Pakistan has to face many challenges in terms of viral diseases especially CLCuV and fibre quality that matches the industrial requirements. More than 90% of the cotton grown throughout the world is Gossypium hirsutum (also known as Upland Cotton or American Cotton), but it is susceptible to Begomoviruses especially CLCuV. Previously we discovered that Gossypium arboreum is resistant to Cotton leaf curl virus (CLCuBuV and CLCuMB). However, the G. arboreum wax deficient mutant (GaWM3) is susceptible to CLCuV. Therefore, epicuticular wax was characterized both quantitatively and qualitatively for its role as physical barrier against whitefly mediated viral transmission and co-related with the titer of each viral component (DNA-A, alphasatellite and betasatellite) in plants. The hypothesis was that CLCuV titer in cotton is dependent on the amount of wax laid down on plant surface and the wax composition. Analysis showed the presence of viral genes, namely alphasatellite, betasatellite and DNA-A in G. hirsutum, *G. harknessii* and GaWM3, whereas no particle was detected in G. arboreum. From results, it was concluded that reduced quantity as well as absence of certain wax compounds could make plants susceptible to Begomoviruses especially CLCuV, infested by whiteflies. For last 7 years it is one of the prime objectives of my research to deal these issues. Keeping in mind the environmental safety aspects, my group opted to go for the cisgenic physiological improvement of the crop. After these findings that epiuticular wax plays a major role in transmission of CLCuV from whiteflies, we opted to go for transformation of *Arabidopsis* wax synthesis gene (CER3) in to *G. hirsutum.* It is highly expressed during the cuticle development in *Arabidopsis* and produces alkanes which account for approximately 50 % of total wax loads in all *Arabidopsis* organs. The key factor of plant waxes that determine the foraging success of different predators is their ability to attach to the plant surface. Better inset attachment to the plant surface is thought to be associated with abridged wax load. It will be investigated that whether wax improvement can do the job of blocking the exposed surface of the plants from the attack of insects and certain abiotic stresses. One of the core objectives is to determine the role of epicuticular wax against virus transmission, insect attachment to plant surface and also study of whitefly infestation and viral symptoms between transgenic and control cotton plants.

Biosafety studies of GMOs.

To estimate the lethal effect of *Bt* and GTG protein on non-target organisms, biosafety studies are of key importance. For crop variety approval the biosafety aspects must be made assured

according to government guidelines. Biosafety studies were carried out on model organisms like, rats, chicks, fish and rabbits for the detection of lethal protein presence in their blood. Experimental animals were fed on *Bt* diet while control on non *Bt* diet and comparison was studied. Morphological and biochemical studies were carried out from different aspects to access the harmful effects on non-target or domestically consumable animals. No harmful effects on these animals were observed which were fed on *Bt* diet.

Cotton Fibre Improvement:

The ultimate product of cotton is fibre. Among the fibre quality parameters, fibre strength, fibre length, and fibre fineness are the primary quality properties that influence textile processing. Microbial cellulose differs from plant cellulose with respect to its high crystallinity and purity, high water-absorption capacity, and mechanical strength. As the major component of cotton fibre is cellulose therefore introduction of bacterial cellulose synthase (Bcs) gene into cotton fibre can bring revolutionary changes in the quality of cotton fibre. The results of this study will provide a foundation and framework for the further studies to gain a comprehensive understanding of the physiological roles of Sus gen in regulating the cotton plant growth, especially for the growth and development of cotton fibre.

Sucrose synthase (Sus) is a key enzyme in the breakdown of sucrose. Sus activity is also proposed to be responsible for cellulose synthesis, by supplying UDP glucose as substrates, which has been shown to be essential for cell wall thickening and cotton fibre cell development. Currently characterization of Sus gene is also one of the focus in cotton species to investigate their expression patterns and ultimate role in fibre improvement.

I am also involved in research on the Agrobacterium mediated transformation of fiber related genes (GhEXPA8 and CpEXPA3) in cotton Gossypium var. NIAB-846. Molecular analysis was performed for the confirmation of transgenes and field expression analysis was performed for three years (cotton fiber quality parameters and fiber quantity parameters). In another project I am working on the investigation of the expression of insecticidal gene Cry 1Ac in cotton (Gossypium hirsutum) under CLCuV bidirectional promoter isolated from cotton leaf curl burewala virus genome. Cotton leaf curl burewala virus is recombinant, consisting of sequences derived from CLCuMuV and CLCuKoV (Amrao et al 2010). Another study which is different from the above was to study the role of epicuticulae wax in transmission of CLCuV. As it is already reported that G. arboretum is resistant to CLCuV, so in order to study the role of epicuticular was , its wax mutant named GaWm3 having 50 % less wax were prepared. An attempt was made by infecting Gossypium arboreum variety 786, its wax mutant GaWM3 along with Gossypium hirsutum MNH-93 with viruliferous whiteflies. The presence of symptoms on leaves and amplification by PCR for virus in G. hirsutum MNH-93 and wax mutant GaWM3 but not in G. arboreum variety 786 clearly determined the presence of virus in G. hirsutum MNH-93 and wax mutant GaWM3 but not in G.arboreum variety 786. The results indicate that wax may act as physical barrier and provide hindrance in transfer of virus by whitefly.

Forensic Science Research:

Fingerprints are a major source of individual identification in forensics. This study was planned to determine the gender variation on the basis of fingerprint ridge density and to predict the fingerprint patterns i.e. loops and whorls on the left and right thumb of both hand in Pakistani population. For the prediction model through SNP typing, 186 subjects were analysed randomly. The selected SNPs were already predicted to be associated with whorls pattern worldwide; and the markers used for the study were rs1523452, rs2244502, rs796973, rs17071864, rs1863718 and rs10201863. These markers were linked to chromosome 3 and 12 respectively. For the gender differentiation data, Seventeen hundred and sixty fingerprints were taken from 176 subjects between 15-65 years old, including 61 men and 115 women. There was no significant difference found in fingerprint pattern frequency, at 0.05 significance level.

Several short tandem repeats (STRs) markers have been examined and applied in forensic investigations to exploit justice in criminal cases and paternity related issues. The most compelling and widely used panel in forensic genetics is a set of 9-17 YSTRs (mutation rate 1 × 10-2) markers to solve the mixture of female and male DNA samples but it is not applicable to differentiate related males. Therefore, there is a need of using recently identified, more advanced RM-YSTRs .

The set of 13 RM YSTR markers (mutation rate 1 × 10-3) is being able to attain a high magnitude of male relatives differentiation as compared to Yfiler kit markers and thus, effectively used to help improving the male lineage differentiation as compared to Y filer marker set. In present work, we studied 100 Sindhi DNA samples using 11 RM-YSTRs that showed haplotye diversity value 0.99297, as no haplotype was repeated. Polymorphism information content was observed in the range of 0.7745 at locus DYS576 to 0.9313 at locus DYF399S1b.

Biological control of plant diseases:

I am working on biological control of plant diseases because the cast of chemicals is very high, environmental pollution and chemical toxicity. I have a contribution in “First Reports” of almost twenty disease causing agents in different plants. Controlling the plant diseases by pollution free bio-control antagonists (rhizobacteria) is desirable now a days. For this purposes samples of potato wilting plants were collected from different locations. Erwinia carotovora isolated, purified and identified. Rhizobacteria were also isolated using serial dilution method. It was concluded that rhizobacteria reduced the percentage of Erwinia carotovora pv carotovora, no matter how the treatments were applied; they always reduce the impact of pathogens and impart benefits to the plants. Essential oils and latex tapped from different plants were also screened for their antiviral activity using molecular markers. The phytochemical compounds responsible for antiviral activity in selected essential oils and latices were screened by qualitative and GC-MS method. Results depicted inhibitory potential of all the tested essential oils and latex against potato leaf roll virus infestation and the effect was found concentration dependent. Our data showed that Aloe vera latex and clove essential oil caused maximum inhibition of viral mRNA at 10% concentration. Two medicinal plants, Nigella sativa & Trachyspermum ammi were screened for phytochemical constituents and nutritional analysis. Tests for flavonoids, tannins, steroids were positive in both spices except saponins. Methanolic extract of N. sativa showed maximum inhibitory potential

against fungi & bacteria. Anti-bacterial activity of n-hexane extract was maximum for bacteria.

Post Doctorate (2006-2007):

During Post Doctorate studies in Nottingham University, UK, Six Abscission Related Genes from Arabidopsis thaliana were characterized. The length of the promoters used to derive expression of these reporters varied in size from 0.5 to 1.5 kb however it is likely that within each of these sequences are domains that render expression abscission-related.

Research Projects Awarded

- 2019-2022 Development of 21 STR Loci DNA Database for Each Province of Pakistan funded by HEC. Rs. 3.66 million (Co-*Principal Investigator*).

- 2014-2017 Development of Bio-pesticide for the control of soil-borne diseases of tomatoes and chilies caused by *Pythium* and *Phytophthora spp*. funded by PARB Rs. 9.20 million (*Team Leader*).
- 2014-2016 Isolation, purification and application of antifungal proteins from *Genoderma lucidum* to control disease of perishable crops, funded by HEC Rs.3.78 million (*Principal Investigator*).
- 2010-2013 Effect of Genetically Modified crops on soil micro-organism and animals, funded by HEC Rs. 3.5 million (*Principal Investigator*).
- 2012-2013 Light interception N2 fertilization alters the concentration of polyphenols in medicinal plants, funded by HEC Rs. 0.499 million (Co-*Principal Investigator*).
- 2012-2013 Evaluation of weed extracts in nitrification inhibition and uptake of synthetic nitrogen for yield enhancement of maize, funded by HEC Rs. 0.5 million (Co-*Principal Investigator*).
- 2012-2013 Isolation, purification and maintenance of *Phythium* and *Phytophtora spp.* from infected chilli areas of Lahore district, funded by University of the Punjab Rs.1.5 million (*Principal Investigator*).
- 2006-2009 Biosafety Studies of Genetically Modified Crops, funded by HEC Rs.1.29 million (*Principal Investigator*).
- 2006-2009 Physical mapping of Bt-gene in Rice and Cotton, funded by HEC Rs. 1.2 million(Co-*Principal Investigator*).

PUBLICATIONS OF DR. AHMAD ALI SHAHID (Shahid, A. A.)

INTERNATIONAL

Sr. No.	PUBLICATIONS	Impact Factor
1.	**Shahid A A,** Salisu I B, Yaqoob A, Rao A Q, Ullah I, Husnain T. (2019) Assessing the fate of recombinant plant DNA in rabbit's tissues fed genetically modified cotton. Journal of Animal Physiology and Animal Nutrition. 00:1–9. ht tps ://doi .org/10.1111/jpn.13243	1.703
2.	Perveen, R., **Shahid, A. A**., Shafique, M., Shehzad, M., & Akram, M. (2019). Kashmiris phylogenetic depictions through uniparental and biparental genetic markers. International journal of legal medicine, 1-2. https://doi.org/10.1007/s00414-019-02082-5	2.094
3.	Saleem, S., **Shahid, A. A**., Shafique, M., Rubab, A., Javed, F., & Husnain, T. (2019). Phylogenetic analysis and haplotype diversity in Christian residents of Lahore, Pakistan, using 17 Y-chromosomal STR loci. International journal of legal medicine, 1-2. https://doi.org/10.1007/s00414-019-02030-3	2.094
4.	Zubair, M., Latif, A., Rao, A. Q., Azam, S., Shahid, N., Samiullah, T. R, **Shahid, A. A**. & Husnain, T. (2019). A Combinational Approach of Enhanced Methanol Production and Double Bt Genes for Broad Spectrum Insect Resistance in Transgenic Cotton. Molecular biotechnology, 1-11. 61: 663. https://doi.org/10.1007/s12033-019-00192-4	2.275
5.	Ali, M., **Shahid, A. A**., & Subhani, M. N. (2019). Maping and monitoring for the valuation of soil fungi and chili damping off. Journal of Animal and Plant Sciences, 29(3), 737-745.	0.52
6.	**Shahid A A;** Haider T., Samiullah T R., Ali M A., Bajwa K S., Rao A Q., Salisu I B and Husnain, T. (2019). Risk Assessment of Transgenic Cotton Harboring *Bt* and Glyphosate Resistance Gene on Fish (*Labeo Rohita*). Journal of Animal and Plant Sciences, 29(6), 1761-1769.	0.52
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31. Ali M, Asif M, Ibrahim A, **Shahid A.A.** Iolation, Purification and Maintenance of *Pythium, Phytophthora sp* from infected chili feilds of Lahore District. International conference, Stress Biology and Biotechnology Challenges and Management. 21-23 May, 2014. Proc. p: 98.

32. Anwar W, Khan S N, **Shahid A.A**, Haider S. M, Aslam M. Agro-ecological distribution of entomopathogenic fungus, *Beauveria bassiana* in Pakistan. International conference, Stress Biology and Biotechnology Challenges and Management. 21-23 May, 2014. Proc. p: 101.

33. **Shahid, A. A;**Iftikhar, S; Javed, S and Haider, M. S. (2013). Efficacy of Essential Oils and Latices against Phytopathogenic Microorganisms of Potato. International Conference on Agriculture and Biotechnology (ICABT 2013), December 29-30, 2013, Kuala Lumpur, Malaysia.

34. Javed S., **Shahid, A. A.,** Muhammad, H. S., Umeera, A., Ahmad, R. and Mushtaq. S. (2012). Nutritional, Phytochemical & Antimicrobial evaluation Of Kitchen Spices *Nigella Sativa* (Kalonji) &*TrachyspermumAmmi*(Ajwain). International Conference on Safe Food and Human Health, GC University Faisalabad, January 10-11, 2012.

35. **Shahid, A.A**. and Ibrahim A. (2011).Management of root knot nematodes of vegetables by using biopesticides. 8th National Conference of Pakistan Phytophathological Society, Department of plant Pathology, University of Agriculture, Faisalabad, November, 28-29, 2011.

36. **Shahid, A.A**.,Gonzalez-Carranza H. Z., Basu. M and Roberts J. A. (2007). Characterization of Putative Abscission Related Genes from A*rabidopsis thaliana.* 17th New Phytologist Symposium on Systems Biology and the Biology of Systems, September 13-14, 2007. Buxton, UK.

37. Rahman, M., Muhammad, N., **Shahid, A. A**., Husnain, T. and Riazuddin, S. (2007). Allelopathic Studies of Transgenic Basmati Rice having Two Insecticidal Genes from *Bacillus thuringiensis*. Proceedings of the International Workshop on Allelopathy-Current Trends and Future Applications, March 18-21, 2007, University of Agriculture, Faisalabad, Pakistan.

38. Husnain, T., **Shahid, A. A.**, Rahman, M., Noor M., Bashir, K. and Riazuddin, S. (2006). Transformation of rice with Bt genes and biosafety studies of transgenic plants. Proceedings of the International Symposium on Sustainable Crop Improvement and Integrated Management, 14-16 September, 2006, University of Agriculture, Faisalabad, Pakistan.

39. Husnain, T., Makhdoom, R., Bushra, R., Bashir, K., Rahman, M., Khan, G. A., **Shahid, A. A**. and Riazuddin, S. (2006). BtPesticidal Genes in Rice & Cotton to Breed Insect Resistance Transgenic Plants. Proceedings of the National Symposium on Biotechnology for Economic Prosperity, 24-26 July 2006, Nathiagali, Pakistan.

40. Husnain, T., **Shahid, A, A**., Naz, F., Rahman, M., Riaz, N., Bashir, K., Rashid, H., and Riazuddin, S. (2005). Transformation, Field Evaluation and Biosafety Studies of Transgenic Rice. Proceedings of International Seminar on Rice Crop, 2-3 October 2005, Rice Research Institute, Kala Shah Kaku, Lahore, Pakistan.

41. Husnain, T., **Shahid. A.A.,**Naz, F., Rahman, M., NaveedaRiaz, Bashir, K., Rashid, H. and Riazuddin, S. (2005). Field evaluation and biosafety of transgenic rice. 18th FAOBMB Symposium, November 20-23, 2005. Pakistan.
42. Husnain.,T., Naz F.,Khanum. F., Fatima, T., Riaz., N.,Maqbool, S.B. Bashir, K.,**ShahidA., A.** Rahman, M., Altosaar, I., Masson, L. and Raizuddin, S. (2005). Genetic improvement and biosafety of indicaBasmatic rice. 5th International rice Genetics Symposium and 3rd International rice Functional Genomics Symposium November 19-23, 2005. Manila, Philippines.
43. **Shahid, A.A**., Nasir, A. I., Zafar. A.U., and Riazuddin, S. (2003). The use of CAMB Biopesticide to control Rice Leaf Folder .7th International Conference, Trends in Biochemistry and Molecular Biology, April 2-5, 2003 . University of the Punjab Lahore, Pakistan.
44. **Shahid, A.A**., Sattar, A., Chaudhary, B and Riazuddin, S. (2002). Determination of Protein Virulemce Factors and Pathogenicity of Entomopathogenic Fungi, March 28-30, 2002. First National Conference of Biology, Biology Block, Government College Lahore, Pakistan.
45. **Shahid, A.A**., Chaudhary, B and Riazuddin, S. (1999). Production of Phytotoxic Compounds from *Ascochytarabiei.*Second National Conference of Plant Pathology and Symposium. Plant diseases of National Economic Importance, September 27-29, 1999. Department of Plant Pathology, Agriculture University, Faisalabad.
46. Latif, Z; **Shahid, A.A;** Rehman. Z.andRiazuddin, S. (1991).Molecular and chemical basis of virulence in Chickpea blight caused by *Ascochytarabiei,* December 16-18, 1991. SAARC Symposium Workshop on the Biological Control of Agriculturally Important Plant Pests held at National Centre of Excellence in Molecular Biology, Lahore.

Conference papers

- Salisu, I. B., **Shahid, A. A.,** Yaqoob, A., Rao, A. Q., Inayat, U., & Husnain, T. (2018). Assessing the fate of recombinant plant DNA in rabbit's tissues fed genetically modified cotton. First International Conference on Applied Zoology (ICAZ) Government College University, Faisalabad.
- K. Nawaz; **A. A. Shahid**; M. N. Subhani; S. Iftikhar; W. Anwar and H. M. Umer Aslam (2017). Screening and Antagonistic Potential of Hydrolytic Enzyme Producing Trichoderma Species: A Tool for Better Agricultural Approach in Pakistan. 13th International Conference on Agricultural, Biological and Ecosystems (ICABE-17) Pattaya (Thailand) Dec. 28-29, 2017.ISBN 978-93-84422-80-6
- **Shahid, A. A.,** Asif, M., Shahbaz, M., & Ali, M. (2016). Antifungal Potential of Ganoderma Lucidum Extract Against Plant Pathogenic Fungi of Calendula Officinalis L. 5th International Conference on Biological, Chemical and Environmental Sciences (BCES-2016) March 24-25, 2016 London (UK).
- **Shahid, A A.,** Yasin, S., Inam-ul-Haq, M., Ali, M. and Haider, M S. (2013) "Use of Rhizobacteria for the Management of Soft Rot Disease of Potato" Athens: ATINER'S Conference Paper Series, No: AGR2013-0770.
- Latif, Z., **Shahid, A. A**. and Riazuddin, S. (1995). Role of Ascochytarabiei virulence factor in breeding resistance to chickpea. Proceeding of the forth International symposium workshop on the application of Molecular Biology Research in Agriculture, Health and Environment. CEMB, Lahore, Pakistan. 149-154.
- Latif, Z., **Shahid, A. A**., Rahman, Z. and Riazuddin, S. (1991). Molecular and chemical basis of virulence in chickpea blight caused by Ascochytarabiei. Proceeding of SAARC Symposium/Workshop on the Biological Control of Agriculturally Important Plant Pests held at Centre for Applied Molecular Biology, Canal Bank Road, Lahore, December, 16-18, 1991

Conferences and Seminars attended

1) Participated as oral presenter in "International Conference on Food, Nutrition, and Agriculture" (ICFNA-19), September 27-28, 2019, Istanbul (Turkey).
2) Participated in "National Dialogue on Ag Biotechnology for food security and Capacity Building of Biosafety Regulators", December 11-12, 2019, Comstech Islamabad.
3) Participated as organizer in Recent Innovations in Molecular Sciences, International Conference of Punjab University (ICPU 2019), Lahore, November 06-08, 2019.
4) Participated in International Symposium on "Stem Cells and Regenerative Medicine" at Centre of Excellence in Molecular Biology, University of the Punjab, Lahore, Pakistan, November 15, 2019.
5) Participated in Symposium "Brain, Neurogenetics and Regenerative Medicine" Centre of Excellence in Molecular Biology, University of the Punjab, Lahore, Pakistan, October 03, 2019.
6) Participated in "Scientific Symposium on brain Neurogenetics and Regenerative Medicine" October 3, 2019, Centre of Excellence in Molecular Biology, University of the Punjab, Lahore, Pakistan.
7) Participated in "Biosafety Leadership Summit" held March 18-20, 2019 at Marriott Hotel, Islamabad.
8) Participated as Organizer in "Web of Science Conference" March 11, 2019, CEMB, University of the Punjab, Lahore.
9) Oral Presentation at 2nd GRIP,s International Conference on Pharmaceutical & Biochemical Sciences (IC-PBS), January 15-17, 2019, Expo Centre Lahore.
10) 3rd International Symposium on "Advances of Molecular Biology in Plant and Health Sciences" December 19-21, 2018, CEMB, University of the Punjab, Lahore.
11) Invited Speaker at "2nd International Conference of Plant Sciences (ICPS)", December 5-7, 2018, GC University, Lahore.
12) 7th Invention to Innovation Summit 2018, March 7-8, 2018, ORIC, University of the Punjab, Lahore.
13) Dual Use Research of Concern (DURC) Workshop, July 16-18, 2018, CEMB, University of the Punjab, Lahore.
14) Oral presentation at the World congress & Expo on "Biotechnology and Bioengineering", March 27-29, 2017, Dubai, UAE.
15) Invited Speaker at International Conference on "Bioethics in Molecular Biology and Biotechnology", July 5-6, 2017, Institute of Biochemistry and Biotechnology, University of Veterinary and animal Sciences, Lahore.
16) International Symposium on "Advances of Molecular Biology in Plant and Health Science, November 21-23, 2017, Centre of Excellence in Molecular Biology, University of the Punjab, Lahore.

17) Two Days Workshop on "Patent Filing & Introduction to Intellectual Property System of Pakistan" May 17-18, 2017, Office of Research Innovation & Commercialization (ORIC), University of the Punjab, Lahore
18) 2nd International Symposium on "Advances of Molecular Biology in Plant and Health Sciences", November 20-23, 2017, Centre of Excellence in Molecular Biology, University of the Punjab, Lahore
19) One day International Seminar on "Sustainable Crop Production for Food Security under Changing Climate", April 18, 2017, IAGS, Punjab University, Lahore.
20) Oral Presentation at 5th International Conference on Biological, Chemical& Environmental Sciences (BCES-2016), March 24-25, 2016, London (United Kingdom)
21) Participated in International Conference on Agriculture, Ecology and Biological Engineering, March 26-27, 2016, London, United Kingdom.
22) Oral Presentation at International Conference on Sustainable Environment and Agriculture (ICSEA 2015). October, 11-12, 2015, New York, USA.
23) 5th International/10th National Conference of Pakistan Phytopathological Society "Crop protection for Sustainable Agriculture" November 23-25, 2015, IAGS, PU Lahore.
24) International Conference on Significance of potash Use in Pakistani Agriculture, 24-25 November 2016, IAGS, University of the Punjab, Lahore
25) Workshop on Next Generation Sequencing (From Physiology to Bio-informatics), December 4 -5, 2015, IAGS, PU, Lahore.
26) International Symposium on "Advances in Molecular Biology of Plants and Health Sciences" December 29-31, 2015, CEMB, PU Lahore.
27) One day Seminar on "Capacity Enhancement in Biosafety Evaluation of GM Crops and Launching of ISAAA Report on GM Crops", NIBGE, Faisalabad (May 11, 2015).
28) 2nd International Conference on "Biotechnology for Sustainable Development" Institute of Industrial Biotechnology, GC University, Lahore (November 26-28, 2014).
29) 1st International Conference on Forensic Sciences & Justice, Department of Chemistry, GC University, Lahore (October 22-24 2014).
30) International Conference of Plant Sciences, Department of Botany, GC University, Lahore (September 22-24, 2014).
31) Invited Speaker at 1st International Conference on Applied Chemical, Biological and Aquatic Sciences (ICACBAS 2014), GC University, Faisalabad (February 18-20, 2014).
32) International Conference on Stress Biology and Biotechnology: Challenges & Management, Institute of Agricultural Sciences, University of Punjab, Lahore, (May, 21-23, 2014).
33) Workshop on Biosafety and Risk Assessment, organized by Biosafety and Bio-resource Committee, University of the Punjab, Lahore, (April 19, 2014).
34) Oral Presentation at "International Conference on Agriculture and Biotechnology" (ICABT 2013). December 29-30, 2013, Kuala Lumpur, Malaysia.

35) Oral Presentation at 6th Annual International Symposium on Agriculture, Athens, Greece (15-18 July, 2013).
36) 2nd Annual Computational Science Conference, International Islamic University, Islamabad. (October 20-25, 2013).
37) 3 Days Workshop on Cotton Leaf Curl Disease (CLCuD) Diagnostics and Resistance, A Practical Approach. Institute of Agricultural Sciences, University of Punjab, Lahore. (August 26-28, 2013).
38) Oral Presentation at 3rd International Conference on Agriculture and Animal Sciences. Bangkok Thiland (November, 24-25, 2012).
39) One day Symposium on Applications of Biotechnology in Health and Agriculture, GC University Faisalabad (March 28, 2012).
40) International Conference on Safe Food and Human Health, GC University Faisalabad (January 10-11, 2012).
41) National UIP Seminar on Developing Local Food Additives/Preservatives, University of the Punjab, Lahore (November 22, 2012).
42) 2nd International Training Workshop on DNA Microarray for Gene Expression, CEMB (March 07-11, 2011).
43) International Training Course on Microarray Technology for Gene discovery and Expression, CEMB (October 05-09, 2009).
44) Symposium-2009, CEMB (March 09-13, 2009).
45) Bio-Forum 2008, CEMB (March 24-29, 2008).
46) Participated in 17th New Phytologist Symposium on Systems Biology and the Biology of Systems, Buxton, UK (September 13-14, 2007).
47) BINASIA-Pakistan National Workshop, CEMB, Lahore (March, 11-12 2006).
48) Lahore Bio-Forum, CEMB, Lahore (March 13-15, 2006).
49) BINASIA-Pakistan National Workshop, CEMB, Lahore (March, 11-12 2006).
50) Lahore Bio-Forum, CEMB, Lahore (March 13-15, 2006).
51) 18th FAOBMB Symposium on Genomics and Proteomics in Health and Agriculture. Institute of Biochemistry and Biotechnology University of the Punjab, Lahore (November 20-23, 2005)
52) Pre-18th FAOBMB Symposium Sattelite Workshop on Bio-informatics. CEMB, Lahore (November 14-19, 2005)
53) International Seminar on Rice crop, Rice Research Institute, Kala Shah Kaku, Lahore (October 2-3, 2005).
54) Workshop on Implementation of National Biosafety Guidelines, NIBGE, Faisalabad (September 1, 2005).
55) Second National conference of biology, Biology block, Government College University, Lahore (April 22-24, 2004).
56) Seventh National Conference on Trends in Biochemistry and Molecular Biology, Institute of Biochemistry and Biotechnology University of the Punjab, Lahore (April 2-5 2004).
57) First National Conference of Biology, Biology Block, Government College Lahore (March 28-30, 2002).

58) Third International Biennial conference of Pakistan Society for Microbiology. Microbiology: Challenges for the new Millennium, organized in collaboration with Centre of Excellent in Molecular Biology, University of the Punjab, Lahore (March 28-30, 2000).
59) Second National Conference of Plant Pathology and Symposium. Plant diseases of National Economic Importance. Department of plant pathology, Agriculture University, Faisalabad (September 27-29, 1999).
60) SAARC Symposium Workshop on the Biological Control of Agriculturally Important Plant Pests held at National Centre of Excellence in Molecular Biology, Lahore (December 16-18, 1991).
61) International Symposium/Workshop on Genomics and Computational Analysis, jointly organized by John Hopkins University, Baltimore, USA and National Centre of Excellence in Molecular Biology, Lahore (October 16-18, 1997).
62) Fifth International Symposium/Workshop on the Applications of Molecular Biological Research in Agriculture, Health and Environment, National Centre of Excellence in Molecular Biology, Lahore, (October 14-15, 1997)
63) Second Annual Lathyrus Conference held at NARC, Islamabad (April 25-27, 1993).
64) Third International Symposium/Workshop on Application of DNA Technology to Agriculture and Health organized by the National Centre of Excellence in Molecular Biology, Lahore (October 24-29, 1992).
65) International Symposium on Contemporary Biology, NARC, Islamabad (November 7-10, 1991).
66) SAARC Symposium Workshop on the Biological Control of Agriculturally Important Plant Pests held at National Centre of Excellence in Molecular Biology, Lahore (December 16-18, 1991).
67) National/International Telecommunication Symposium on Plant Biotechnology, NARC, Islamabad (August 16-19, 1990).
68) Third In-country Training Programme for Agricultural Graduates of Baluchistan and Northern Areas (December, 1989 to August, 1990).
69) National Laboratory Workshop on Cloned Gene Products (November 2-16, 1989).