PROF. DR. MUHAMMAD BABER

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Career Objectives

- ***My long term interests are in Plant Genetics, Molecular breeding research areas***
- ***To keep up with the cutting edges of Biotechnology.***
- ***To use my skills in the best possible ways to achieve the goals.***
- ***To enhance my professional skills in a dynamic and fast paces work place.***
- ***To solve problems in an effective/creative manner in a challenging position.***

ACADEMIC QUALIFICATION

- **(2013) Post Doc (University of Toronto Canada)**
- **(2009) PhD (Plant Biotechnology)**
  Under Split PhD Program between
  National Institute for Biotechnology and Genetic Engineering ***(NIBGE)*** Quaid-i-Azam University Islamabad Pakistan. And ***University of Georgia, Tifton campus, USA.***
  Topic: " QTLs conferring root architecture in an inter-specific cross *G. hirsutum L. x G. barbadense."*
- **(1994) M. Sc. (Hons) (Plant Breeding and Genetics)**
  University of Agriculture Faisalabad Pakistan. "Genetic analysis of Agronomic and Fiber traits in Cotton"
- **(1991) B.Sc. (Hons) (Plant Breeding and Genetics)**
  University of Agriculture Faisalabad Pakistan. .
- **(1986) F. Sc. (Pre-Medical)**
  H-8 College Islamabad Pakistan.
- **(1984) Matric**
  Pak. H. Sec. School Manama Bahrain.

AWARDS & FELLOWSHIPS

- Post-Doctoral Fellowship for University of Toronto by HEC (July 2012 to June 2013)
- Research Fellowship by University of Georgia USA (Dec. 2006 June 2007)
- Pre-Doctoral Fellowship for University of Georgia USA by HEC Pakistan (Dec 2005 to Nov 2006)
- Indigenous PhD scholarship from HEC, Pakistan. (Feb 2003- Nov2005)
- Merit Scholarship during graduate studies

EMPLOYMENT RECORD

- **Dec 18 2014 to 21 Feb 2021 Director** Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Pakistan.
- **Dec 18 2013** Director Sahiwal Campus Bahauddin Zakariya University, Multan, Pakistan
- **April 2014** working **as Professor** till now at Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Pakistan.
- **Aug 2011** working as ***Associate Professor***, Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Pakistan.
- **July 2012-June 2013**: Working as ***Postdoc*** Fellow at **University of Toronto ON Canada**.
- **Oct-2007 to Aug 2011** worked as ***Assistant Professor***, Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Pakistan.
- **June 2003 to Sep 2007** worked as ***Assistant Professor***, Dept. of Plant Breeding and Genetics, University College of Agriculture, Bahauddin Zakariya University, Multan, Pakistan.
- **Dec. 1995 to May 2003** worked ***as Lecturer*** Dept. of Plant Breeding and Genetics, University College of Agriculture, Bahauddin Zakariya University, Multan, Pakistan.

ADMINISTRATIVE EXPERIENCE

- **Mar 15 2024 to date (03 months)** Director Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Pakistan.
- **Dec 18 2014 till Feb 21 2021 (06 years)** Director Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan, Pakistan.
- **Dec 18 2013** to **Dec 17 2014 (01 year)** Director Sahiwal Campus Bahauddin Zakariya University, Multan, Pakistan
- **March 2011-June 2012**: Worked as Superintendent, Qasim Hall at Bahauddin Zakariya University, Multan, Pakistan.
- **Sep 2007-June 2012**: Incharge Fish Ponds at Bahauddin Zakariya University, Multan, Pakistan.

Development of PC-1 (Strengthening of Institute of Biotechnology)

- **Project Director PSDP project of**
- **Rs. 531.937 M**

(PC-1 completed)

Research Projects Completed OR Under Completion

1. **Genetic Analysis and molecular mapping of salt tolerant QTLs in diverse wheat germplasm (HEC as CoPI). Rs. 0.41 M**
2. **Identification of novel sources of salt tolerance in diverse rice germplasm through molecular approaches (HEC as CoPI). Rs. 0.25 M**
3. **Bioprospecting the rhizosphere of noxious weed for potent plant growth promoting rhizobacteria (HEC as CoPI). Rs. 0.48 M**
4. **Plant growth rhizobacteria as means to cope with organophosphate residues in cotton plant (BZU PI). Rs. 0.30 M**
5. **Molecular and Biochemical Characterization of Multi-trait PGPR of Cyprus rotundas L. as Biocontrol Agent (BZU PI). Rs. 0.30 M**
6. **Study of Physiologically Diverse Plant Growth Promoting Rhizobacteria in the Alleviation of Salt Stress in Wheat (*Triticum aestivum* L.) (BZU PI). Rs. 0.30 M**
7. **Bioprospecting The Rhizosphere of Noxious Weed for Potent Plant Growth Promoting Rhizobacteria (BZU PI). Rs. 0.30 M**
8. **Two Varieties named ZAKARIYA-1 and BZU-5 which are Bt-cotton varieties has been approved by federal seed certification dept, govt of Pakistan (BZU PI). Rs. 0.30 M**

International Research Papers & Publications

Sr. No.	Titles of Research	Impact Factor
1.	Tahir Naqqasha, Aeman Aziza, Muhammad Baber, Muhammad Shahidb, Muhammad Sajidc, Radicetti Emanueled, Abdel-Rhman Z. Gaafare, Mohamed S. Hodhodf, and Ghulam Haiderg Metal-tolerant morganella morganii isolates can potentially mediate nickel stress tolerance in Arabidopsis by upregulating antioxidative enzyme activities **Plant Signaling & Behavior (2024)** https://doi.org/10.1080/15592324.2024.2318513	**2.81**
2.	Tahir Naqqash, Aeman Aziz, Madiha Gohar, Jallat Khan, Shahbaz Ali, Emanuele Radicetti, **Muhammad Babar**, Manzer H. Siddiqui & Ghulam Haider Heavy metal-resistant rhizobacteria fosters to alleviate the cadmium toxicity in Arabidopsis by upregulating the plant physiological responses **International Journal of Phytoremediation (2024)** https://doi.org/10.1080/15592324.2024.2318513	**3.5**
3.	Mehvish, A.; Aziz, A.; Bukhari, B.; Qayyum, H.; Mahmood, Z.; **Baber, M.**; Sajjad, M.; Pang, X.; Wang, F. Identification of Single-Nucleotide Polymorphisms (SNPs) Associated with Heat Tolerance at the Reproductive Stage in Synthetic Hexaploid Wheats Using GWASs. **Plants (2023),** 12, 1610. https://doi.org/10.3390/plants12081610.	**4.658**
4.	Sidra Aslam, Syed Bilal Hussain, **Muhammad Baber**, Sabahat Shaheen, Seema Aslam, Raheela Waheed, Hyojin Seo,* and Muhammad Tehseen Azhar*(2023) Estimation of Drought Tolerance Indices in Upland Cotton under Water Deficit Conditions **(2023) Agronomy (2023), 13, 984.** https://doi.org/10.3390/agronomy13040984	**3.949**
5.	Sabahat Shaheen, **Muhammad Baber**, Sidra Aslam, Seema Aslam, Mehak Shaheen, Raheela Waheed, Hyojin Seo, Muhammad Tehseen Azhar * Effect of NaCl on Moprho-Physiological and Biochemical Responses in Gossypium hirsutum L. **(2023)** ***Agronomy***, *13*(4), 1012; https://doi.org/10.3390/agronomy13041012	**3.949**
6.	Muhammad N. Sattar1 | Muhammad Javed2 | Syed B. Hussain3 **Muhammad Babar3,** Peng W. Chee4 | Zafar Iqbal1 | Muhammad Munir5 Sallah A. Al-Hashedi1 Mapping of quantitative trait loci controlling cotton leaf curl disease resistance in upland cotton (**2023**) **Plant Breed. 2023;1–11.** https://doi.org/10.1111/pbr.13084	**2.44**
7.	Muhammad Asif a, Mourad Ben Said b,c, Asia Parveen d, Arusa Ejaz d, Muhammad Ikram e, Mian Muhammad Awais f, Sezayi Ozubek g, Munir Aktas g, **Muhammad Baber a,***, Furhan Iqbal d,* Seasonal survey, risk factor's analysis and genotyping of *Theileria annulata* infecting cattle in Punjab province, Pakistan **(2022) Acta Tropica** https://doi.org/10.1016/j.actatropica.2022.106587	**3.14**
8.	Muhammad Asif 1,†, Mourad Ben Said 2,3,† , Rommel Lenin Vinueza 4,5, Renato Leon 5, Nadeem Ahmad 6, Asia Parveen 7, Adil Khan 8, Arusa Ejaz 6, Muhammad Ali 9, Asmat Ullah Khan 10, **Muhammad Baber 1**, and Furhan Iqbal 6, Seasonal Investigation of Anaplasma marginale Infection in Pakistani Cattle Reveals Hematological and Biochemical Changes, Multiple Associated Risk Factors and msp5 Gene Conservation **(2022) pathogens** https://doi.org/10.3390/pathogens11111261	**7.464**

9.	Tahir Naqqash1 · Mahreen Fatima1 · Saif-ur-Rehman1 · Sherien Bukhat1 · Muhammad Shahid2 · Ghulam Shabir1 Muhammad Tahir3 · Muhammad Arshad4 · **Muhammad Babar1.** Plant Growth-Promoting Rhizobacteria Significantly Improves Growth Attributes and Photosynthetic Machinery in Wheat **(2022) Journal of Plant Growth Regulation** https://doi.org/10.1007/s00344-021-10519-8	**4.169**
10.	Hira Jamil,1 Adeela Awan,2 Atif Akbar,3 Muhammad Babar,4 Sana Akhtar,5 Rana Khalid Iqbal,6 Furhan Iqbal7. A study of association between presence or absence of GSTT1 and GSTM1 and/or single nucleotide polymorphism in FABP2 and GSTP1 with incidence of diabetes type 2: A case-control study. **(2022).** ***Journal of Pakistan Medical association*** Vol. 72, No. 4, April 2022.	**0.781**
11.	Rani, S.; **Baber, M**.; Naqqash, T.; Malik, S.A. Identification and Genetic Mapping of Potential QTLs Conferring Heat Tolerance in Cotton (Gossypium hirsutum L.) by Using Micro Satellite Marker's Approach. ***Agronomy*** **2022**, *12*, 1381. https://doi.org/10.3390/agronomy12061381	**3.949**
12.	BIRRA BUKHARI, AMBREEN MEHVISH, **MUHAMMAD BABAR**, SAMAD RAZA* ,SYED INAM ULLAH, MUHAMMAD AHSAN QURESHI, MUHAMMAD SHAHZAD ZAFAR, AMBREEN NAZ, SHEEBA RAUF, FAIZA SHAUKAT AND NIMRA RAUF "GENETIC DIVERSITY ESTIMATION AMONG THIRTEEN LATE MATURING MANGO VARIETIES USING SSR MARKERS" **Plant Cell Biotechnology and Molecular Biology** 23(21&22):32-41; **2022**	**HJRS Y Category**
13.	Muhammad Asif a, Zinnia Mansoor a, Syed Bilal Hussain b, Muhammad Arshad c, **Muhammad Babar** b and Tahir Naqqash b "Characterization of Brassica napus (Canola) Germplasm Based on Microsatellite Markers" **Biotechnology Journal International** 25(6): 1-7, **2021**; Article no.BJI.77844	**Web of Science/ Master Journal list**
14.	Estimation of Genetic Diversity among Canola Accessions using Simple Sequence Repeat Markers **(2021)** Ahmad, J., **Baber, M**., Nazeer, W., Hamdullah, S., Somroo, A. A., Ali, S., Fatima, R., & Aslam, S. ***Journal of Bioresource Management***, 8 (4). DOI: https://doi.org/10.35691/JBM.1202.0205	**Web of Science/ Master Journal list**
15.	Genetic diversity of rohu, *Labeo rohita* (Hamilton, 1822) from Chenab River and its reservoirs **(2021)** Mulazim Hussain[1], Tahir Naqqash[2], Ghulam Yaseen1, Qurat-ul-ain Amin[2], Ghulam Shabir[2], **Muhammad Babar[2]**, ***Journal of Biotech Research***, **2021**; 12:144-151.	**HEC Recognize Y**
16.	Effects of Silicon and Selenium in Alleviation of Drought Stress in Rice **(2021)** Fozia Ghouri[1] & Zeeshan Ali[2] & Muhammad Naeem[2] & Sami Ul-Allah[3] & **Muhammad Babar[4]** & Faheem Shehzad Baloch[5] & Waqas Shafqat Chattah[2] & Muhammad Qasim Shahid[1]. ***Silicon*** https://doi.org/10.1007/s12633-021-01277-z.	**2.67**
17.	Transporters and transcription factors gene families involved in improving nitrogen use efficiency (NUE) and assimilation in rice (Oryza sativa L.) **(2021)** Tahmina Nazish [1 2], Mamoona Arshad [3], Sami Ullah Jan [2 4], Ayesha Javaid [2], Muhammad Hassaan Khan [5], Muhammad Afzal Naeem [5], **Muhammad Baber [1]**, Mohsin Ali [6] ***Transgenic Res.*** **2021** Sep 15.doi: 10.1007/s 11248-021-00284-5.	**1.87**
18.	Mining of halo-tolerant plant growth promoting rhizobacteria and their impact on wheat plants under saline conditions (**2021**). **MuhammadBabar[a]**Saif-ur-Rehman[a] Sumaira Rasul [a]KashifAslam [a]RameeshaAbbas[a] Habib-ur-RehmanAthar[b] IrfanManzoor[c] MuhammadKashif Hanif[d]TahirNaqqash	**4.01**

	Journal of King Saud University Science Volume 33, Issue 3, May 2021, 101372. https://doi.org/10.1016/j.jksus.2021.101372 . IF (3.816)	
19.	Role of QTL mapping to circumscribe various diseases in different crops with special emphasis on cotton**. (2019)** Javed M*, Hussain SB, **Baber M**. ***J Genet Mol Biol.*** Vol. 3 Issue 1 (0.378).	**0.378**
20.	Halotolerant PGPR: A hope for cultivation of saline soils Rameesha Abbas Sumaira Rasula **Muhammad Baber** Muhammad Shahid Fathia Mubeen Tahir Naqqasha . ***Journal of King Saud University – Science* (2019)**. Volume 31, Issue 4, , Pages 1195-1201.	**4.01**
21.	Muhammad Asad Akhtar, Haseeb Anwar**, Muhammad Baber**, Masroor Muhammad, Tariq Pervez (**2018**) Synthesis of Tobramycin Stabilized Silver Nanoparticles and its catalytic and antibacterial activity against pathogenic bacteria, ***Journal of Inorganic and Organometallic Polymers and Materials. JOIP-D-18-00626R1..***	**3.54**
22.	Weed rhizosphere: a source of novel plant growth promoting rhizobacteria (PGPR) Muhammad Baber1, Mahreen Fatima1, Rameesha Abbas1, Muther Mansoor Qaisrani2, Sidra Naz3, Muhammad Kashif Hanif4, Tahir Naqqash1* **International Journal of Biosciences | IJB** | (**2018**) http://dx.doi.org/10.12692/ijb/13.1.224-234	**10.75**
23.	*Farah Bano, **Muhammad Baber**, Amjad Ali,1 Ziaullah Shah,2 and Syed Aun Muhammad Biosynthesis, Characterization, and Biological Activities of Iron Nanoparticles using Sesamum indicum Seeds Extract.* ***(2017)*** ***Pharmacogn Mag***. 2017 Jan; 13(Suppl 1): S33–S36.	***1.085***
24.	Tahmina Nazish, Ghulam Shabbir, Azam Ali, Sami-ul-Allah, Muhammad Naeem, Sana Batool, Huma Arshad, Muhammad Javed, Syed Bilal Hussain, Kashif Aslam, Rabia Seher, Maria Tahir, **Muhammad Baber*(2017**) Molecular diversity analysis of Pakistani mango (*Mangifera indica* L.) varieties based on microsatellite markers. ***Genet. Mol. Research* 16 (2) 2017**	**1.013**
25.	Ghulam Shabir, Kashif Aslam, Muhammad Shahid, Abdul Rehman Khan, Hamid Manzoor, Sibgha Noreen, Mueen Alam Khan, Muhammad Baber, Muhammad Sabar ,Shahid Masood Shah*, and Muhammad Arif ; Rice Molecular Markers and Genetic Mapping: Current Status and Prospects ***Journal of Integrative Agriculture 2017,*** 16(0): 60345-7	**2.84**
26.	Muhammad Javed1*, Syed Bilal Hussain2 and Muhammad Babar (2017) **Assessment of genetic diversity of cotton genotypes for various economic traits against Cotton leaf curl disease (CLCuD)" *Genetics and Molecular Research*** 16 (1) 2017: gmr16019446	**1.013**
27.	Bano[1], Hassan. M[1], S.B. Hussain[2], M. Javed[2],M.A. Zulifiqar[3], M.Younas[4],M. Baber[5]and M. Zubair[6] **Estimation of genetic variability among peanut genotypes for resistance to leaf spot disease, *Genet. Mol. Research* 15(3) 15038213 2016.**	**1.013**
28.	M. Naeem, F. Ghouri, M. Q. Shahid, M. Iqbal, S. Allah, M. Babar and M. Rana **Genetic Diversity Studies of Mutated and Non-Mutated Rice Varieties. *Genet. Mol. Research* 2015** 16;14(4):17109-23. doi: 10.4238/2015.December.16.11.	**1.013**
29.	Muhammad Ilyas, Tariq Mahmood, Ahmad Ali, Muhammad Babar, Awais Rasheed and Abdul Mujeeb-Kazi. ***(2015). Characterization of D-genome diversity for tolerance to boron toxicity in synthetic hexaploid wheat and in silico analysis of candidate genes. Acta Physiol Plantarum 37(17) 2015.***	**2.35**
30.	Muhammad Babar, Syed Bilal Hussain, Muhammad Javed, Raheela Waheed, Shagufta Akhter, Fozia Bibi, Rifat Salahuddin, Muhammad Ali, Farrukh Naveed and Hasnain Nawaz Khan ***(2014)*** Genetic diversity and phylogenetic relationships in	**0.425**

	Citrus rootstocks using PCR- based RAPD markers. ***Journal of Food, Agriculture & Environment.*** 12 (2): 482-485. 2014	
31.	Muhammad Babar, Wajad Nazeer, Iqra Aslam, Raheela Waheed, Ammarah Hasnain, Muhammad Naeem, Fiaz Ahmad, Muhammad Ijaz, Baoliang Zhou. Correlation, Genetic Diversity and QTL Mapping for drought Tolerance in Cotton (*Gossypium hirsutum* L.) ***Bothalia Journal. 44(4) 2014.***	**JCR Y**
32.	Ayesha Imtiaz, Aleem Ahmed Khan, ***Muhammad Babar***, Maria Riaz, Noreen Akhtar, Muhammad Arshad and Imran Khaliq ***(2011)*** Genetic diversity of Pakistani common myna (*Acridotheres tristis*) revealed by RAPD-PCR. ***Afric. J. Biotechnology***. 10(40), 7751-7755.	**0.794**
33.	Noreen Akhter, Aleem Ahmed Khan, ***Muhammad Babar,*** Maria Riaz, Ayesha Imtiaz and Imran Khaliq ***(2011)*** Evaluation of Genetic structure of an urban dwelling species Bank Myna (*Acridotheres ginginisnus*) using RAPD analysis. ***Afric. J. Biotechnology***. 10(33), 6342-6347.	**0.794**
34.	Ghulam Sarwar, ***Muhammad Baber***, Nazim Hussain, Iftikhar Ahmed Khan, Muhammad Naeem, Muhammad Aman ullah and Azhar Ali Khan ***(2011)*** Genetic dissection of yield and its components in upland cotton (*Gossypium hirsutum* L.) ***Afric. J. Agric. Research***. Vol. 6(11), .2527-2531.	**0.263**
35.	Shahbaz M, A. A. Khan, ***M. Babar***, M. Riaz, N. Akhter, and I. Khaliq ***(2010)*** Population Genetic structure of Rufous-Vented Prinia (Prinia Burnesii) In Pakistan. ***Afric. J. Biotechnology***. Vol. 9(53) 9077-9081.	**0.794**
36.	Khaliq, I., ***M. Babar***, M. Riaz, and A. A. Khan. ***(2010)*** Genetic diversity in see-see partridge (*Ammoperdix griseogularis, Galliformes*) populations from sub-Himalayan Mountain ranges of Pakistan. ***Belgian J. Zoology*** Vol. 140(2) 227-232.	**1.474**
37.	Wattoo, J.I., A. S. Khan, Z. Ali, ***M. Babar***, M. Naeem, M. Amanullah, and N. Hussain ***(2010)*** Study of correlation among yield related traits and path coefficient analysis in rice *(Oryza Sativa* L.). ***African J. Biotech***. Vol. 9(46) 7853-7856.	**0.794**
38.	Naveed, S. A., ***M. Babar***, A. Arif, Y. Zafar, M. Sabar, I. Ali, M. Chragh and M. Arif. ***(2010).*** Detection of bacterial blight resistant gene xa5 using linked marker approaches. ***Afric. J. Biotechnology***. Vol. 9(24) 3549-3554.	**0.794**
39.	***Babar M.,*** A. F. Mashhadi, A. Mehvish, A. N. Zahra, R. Waheed, A. Hasnain, S. Rahman, N. Hussain, M. Ali, I. Khaliq and A. Aziz. ***(2010)***. Identification of rust resistance genes Lr10 and Sr9a in Pakistani wheat germplasm using PCR based molecular markers. ***Afric. J. Biotechnology***. Vol. 9 (8) 1144-1150.	**0.794**
40.	Arif, M., M. Jaffar, ***M. Babar***, M. A. Sheikh, S. Kousar, A. Arif and Y. Zafar ***(2008)*** Identification of bacterial blight resistance gene Xa4 in Pakistani rice germplasm using PCR based markers. ***Afric. J. Biotechnology***. Vol. 7(5) 541-545.	**0.794**

National Research Papers & Publications

Sr. No.	Titles of Research	Impact Factor/ HEC Recognize Journal
1.	Investigation of genetic diversity and phylogenetic relationship of Ctenopharyngodon idella from different regions of Punjab by using SSR Markers Muhammad Nasir Khan Babar[1] , Tahir Naqqash[2] , Aasma Noureen[1] , Aneela Kanwal[1] , Muhammad Baber[2] , Nabeela Tariq[3] , Nadia Noureen[4] and Tasleem Kausar[4]* **(2020)** ***Pure & Appl. Biol***., 11(1):209-216, March, 2022 http://dx.doi.org/10.19045/bspab.2022.110022.	**HEC Recognize Y**
2.	Molecular diversity of Pakistani upland cotton (Gossypium hirsutum L.) varieties based on microsatellite markers **(2020)** Seema Aslam, Huma Iqbal, Mujahid Hussain, Muhammad Baber. ***Pakistan Journal of Biochemistry and Biotechnology*** (PJBB) Volume 1, Issue 2 (2020), pp. 51.	**HEC Recognize Y**
3.	Liaqat Hussain[1], Khizar Abbas[1], Bilal Ahmad[1], **Muhammad Baber[2]**, Syed Aun Muhammad[2] and Muhammad Imran Qadir[2]* **Analgesic and anti-inflammatory activity of aqueous-methanolic extract of *Aerva javanica. Pak. J. Pharm. Sci., Vol.30, No.1, January 2017, pp.213-215***.	**0.684**
4.	Muhammad Imran Qadir*, Muhummad Baber, Zara Ahmed "In Silico Targeting of Interleukin-1 by Modified Margaric Acid" ***Journal of Rashid Latif Medical College*** VOL .4 NO.1 JAN – JUN 2015.	
5.	Syed Bilal Hussain, Muhammad Atif Wahid, Muhammad Zubair, Muhammad Babar And Kashif Wahid ***(2014)*** Assessment of germplasm using Multivariate Analysis For Grain Yield and Quality Traits in Spring Wheat. ***Pak. J. Bot . 46(3): 989-994, 2014.***	**0.972**
6.	Riaz , M., A. A. Khan, ***M. Babar***, N. Akhter, M. Shahbaz and I. Khaliq ***(2011)*** High genetic diversity revealed by RAPD markers in the Black Francolin (*Francolinus francolinus*, *Galliformes*) of Pakistan***. Pak .J. Zoology*** Vol. 43(5): 889-896.	**0.831**
7.	Saeed A., U. Waheed, M. Arshad, Q. M. Khan, M. Ali & ***M. Babar (2011)*** RT-PCT Evaluation of Foot-and-Mouth Disease Serotype O in Saliva, Tracheal and Vesicular Samples of Goat in Punjab Pakistan. ***Pak. J. Zoology*** Vol. 43(4) 808-811.	**0.831**
8.	***Babar, M.,*** A. A. Khan, A. Arif, Y. Zafar and M. Arif ***(2007)*** Path analysis of some leaf and panicle traits affecting grain yield in double haploid lines of rice (Oryza sativa L.). ***J. Agric. Res***. 45(4) 245-252.	**HEC Recognize Y**
9.	Rasheed, S. M., H.A. Sadaqat and ***M. Babar***. ***(2002)*** Inter-relationship among grain quality traits of Rice. ***Asian Journal of Plant Sciences***. Vol. 1 No. 3, 245-247.	**HEC Recognize Y**
10.	Rasheed, S. M., H.A. Sadaqat and ***M. Babar. (2002)*** Cause and effect relations of panicle traits in Rice (*Oryza sativa* L.) ***Asian Journal of Plant Sciences***. Vol. 1 No. 2, 123-125.	**HEC Recognize Y**
11.	Rasheed, S. M., H.A. Sadaqat and ***M. Babar. (2002)*** Correlation and path coefficient analysis for yield and its components in Rice (*Oryza sativa* L.). **Asian Journal of Plant Sciences**. Vol. 1 No. 3, 241-245.	**HEC Recognize Y**
12.	***Babar, M.*** and I. A. Khan. ***(2001)*** Genetic Analysis of yield and its components in up land cotton. (*Gossypium hirsutum* L.) ***Pakistan Journal of Biological Sciences*** Supplementary Issue-1, 13-15	**HEC Recognize Y**
13.	***Babar, M.*** and I. A. Khan. **(1999)** Genetic Analysis of some Agronomic & fiber characters in up land cotton (*Gossypium hirsutum* L.). ***Pakistan Journal of Biological Sciences*** Vol. 2 No. 4 1484-1486.	**HEC Recognize Y**

SUPERVISION EXPERIENCE

SCHOLAR(S) AWARDED PHD DEGREE UNDER MY SUPERVISION

Sr. No.	Name of Student(s)	Status of Student(s) (HEC/NON-HEC)	Subject/ Session	Date of Registration/ Confirmation	Title of Thesis	Status
1.	Shazia Rani 2012-2017	**HEC scholar**	**Botany**	**07-3-2012/ 25-3-2013**	Mapping QTLs associated with heat tolerance in cotton using microsatellite markers	Degree awarded
2.	Muhammad Javed 2012-2017	**HEC scholar**	**Plant Breeding and Genetics**	**21-9-2011/ 21-09-2012**	QTLs mapping linked with cotton leaf curl disease resistance and morphological traits in cotton using microsatellite markers	Degree awarded
3.	Ambreen Mehvish 2016-21	**Nil**	**Biotechnology**	**04-04-2016/ 04-04-2017**	Genetic and Molecular Analyses of Pakistani Wheat Diversity for Breeding Yield and Sustainability	Degree awarded
4.	Muhammad Asif	**Nil**	**Biotechnology**	**06-10-2020/ 06-10-2021**	Detection of blood borne pathogens in cattle samples collected from South Punjab Pakistan by using molecular approach	Degree awarded

SCHOLAR(S) REGISTERED WITH SUPERVISOR AT PH.D. LELVEL

Sr. No.	Name of Student(s)	Status of Student(s) (HEC/NON-HEC)	Subject/ Session	Date of Registration/ Confirmation	Title of Thesis	Status
1.	Qurat ul Ain Amin 2017-22		**Biotechnology**	**10-10-2017/ 10-10-2018**	Genetic Map construction and quantitative traits loci (QTLs) detection of economical traits using mapping population of Hybrid from *Labeo rohita* and *Catla Catla*	
2.	Seema Aslam 2020-2025		**Biotechnology**	**06-10-2020/ 06-10-2021**	Biochemical characterization, molecular fingerprinting and bio control potential of PGPR isolated from Rhizospheric soil of cotton wheat crop rotational area	
3.	Sabahat Shaheen 2020-2025		**Biotechnology**	**06-10-2020/ 06-10-2021**	Monitoring of various biochemical assays and NHX gene family in *Gossypium hirsutum* L. under salinity stress	
4.	Ali Ahmad 2022-2027		**Biotechnology**		Genome wide characterization and functional analysis of bromodomain (brd) gene family in *gossypium hirsutum* L. under abiotic stresses	
5.						

PhD Topic and Abstract *PIN #. 041-212538 A-055*

QTLs conferring root architecture in an interspecific Gossypium hirsutum x Gossypium barbadense population.

Muhammad Baber, Sajid ur Rahman, Xinlian Shen, Edward lubbers, Yusuf Zafar,Peng W Chee
Crop and Soil Science, University of Georgia Tifton GA 31793, USA

Abstract

Genetic modification of the rooting system may lead to more drought tolerant upland cotton. A number of different root and physiological traits have been suggested as important mechanism of drought tolerance of cotton. This study was conducted to identify and map quantitative trait loci (QTLs) conferring root architecture in an interspecific cross *Gossypium hirsutum x Gossypium barbadense* population. An F_2 population was developed which differed greatly in root characteristics. A genetic map covering 3190.50 cM, with 219 marker loci and 26 linkage groups, was constructed by using this F_2 population. The Two F_2 populations were grown in tube and pots experiments. Tap root traits (length, weight, and lateral root numbers) were evaluated. QTL analysis via composite interval mapping detected 17 QTLs, for three root traits including 3 QTLs for fresh root weight, 6 QTLs for lateral root numbers, and 2 QTLs for tap root length in tube experiment, while in pot experiment, 3 QTLs for fresh root weight and 3 QTLs for lateral root numbers were identified. Individually the QTLs accounted for 11-28% of phenotypic variation. Common QTLs were indentified for fresh root weight and lateral root numbers on chr. 18 & chr. 25 respectively, in both pot and tube experiments. The QTLs for root traits, firstly detected in Gossypium, may provide a basis for marker-assisted selection to improve productivity in root-crop breeding.

Post Doc Research Topic: (2012-2013)

"Requirement(S) For Replication and Packaging of Lucerne Transient Streak Virus Satellite RNA"

University of Toronto Dept. Cell & Systems Biology 25 Willcocks St. Toronto, ON, Canada, M5S 3B2

Abstract:

The satellite RNA of Lucerne Transient Streak Virus (LTSV) is a 322-nucleotide, single-stranded circular RNA that, as a result of its high self-complementarity and extensive base-pairing, has a rod-like structure very similar to that of viroids. However, unlike viroids, LTSV satellite RNA is unable to replicate independently of a helper virus. As it does not encode any translation products, the satellite RNA is proposed to rely on viral-encoded proteins for the replication and/or cell-to-cell movement that facilitates its systemic infection in a host. To investigate the requirements for replication of the LTSV satellite RNA, transgenic plant systems were generated to express the viral RNA dependent RNA polymerase and predicted viral transport protein independently as well as in combination. Results of infectivity assays of these transgenic lines demonstrated for the first time that the viral-encoded RNA-dependent RNA polymerase is necessary and sufficient for the replication of LTSV satellite RNA, and that no additional viral proteins are required for its cell-to-cell or systemic transport. In addition to its reliance on the replicative machinery of the helper virus, LTSV satellite RNA is also dependent on its helper virus for encapsidation. Transgenic plants were therefore generated to study whether interactions between genomic and satellite RNA, as well as the characteristics of the satellite itself, are important for satellite packaging and capsid assembly, however further study is required to investigate whether the satellite is able to be

packaged independently of a helper virus and whether directionality influences the packaging ability of the satellite.

INTERNATIONAL CONFERENCES/ WORKSHOPS ATTENDED

1. **Visit University of Bonn to sign MOU between University of Bonn and Inst. of Molecular Biology and Biotechnology B. Z. University Multan Pakistan (2017).**
2. **The ICGEB Workshop on Phenomes and Genomes School of life Sciences, Fudan University Shanghai China. (2016)**
3. **5 TH INTERNATIONAL CONFERENCE ON MODERN TRENDS IN SCIENCE, ENGINEERING AND TECHNOLOGY 2016 (ICMTSET 2016) held in Hyatt Place Hotel, Al Rigga, Dubai, UAE during 3 rd & 4th April (2016)**
4. **Muhammad Babar**, Sajid ur-Rahman, Xinlian Shen and Peng W. Chee, Inheritance of Root Morphology in a Population of Cross between *Gossypium hirsutum x Gossypium barbadense*. **Belt Wide Cotton Conference, Jan 9-12 2007, New Orleans, Louisiana, USA. (**http://ncc.confex.com/ncc/2007/techprogram/S1491.HTM**)**
5. **Muhammad Babar**. Plant retreat conference **(2006)** University of Georgia, Lake linear Atlanta Georgia USA.
6. Baohua Wang, **Muhammad Babar**, Sajid ur Rahman, Xinlian Shen and Peng W. Chee, "QTL Mapping of Root Architecture Traits in an Interspecific *Gossypium hirsutum x Gossypium barbadense* Population" 106th Annual Meeting of The Southern Association of Agricultural Scientists Biochemistry and Biotechnology Division. Westin Peachtree Plaza, Tower Room 1208 Atlanta, GA. USA., January 31 -February 3, **2009** www.saasinc.org/2009-Atlanta/Programs/Biochem-Biotech.pdf
7. Muhammad Arif, Muhammad Shahzad and **Muhammad Babar**. Identification of Bacterial Blight gene Xa5 in Pakistani rice germplasm using PCR based markers. (Poster presentation) International Conference of Plant Scientists 21-24 April **2008**. University of Agriculture Faisalabad, Pakistan.

Teaching and Research Experience

Under graduate level:

Sr. No.	Class	Course Code	Course Name	Credit Hours
1.	M.Sc. Morning	Biotech-15	Genomics and Proteomics (M)	3(3+0)
2.	M.Sc. Morning	Biotech-3	Methods in Molecular Biology (F)	3(1+2)
3.	M.Sc. Evenin)	Biotech-3	Methods in Molecular Biology (F)	3(1+2)
4.	BS Morning	BSBT-211	Classical Genetics (F)	3(3+0)
5.	BS Evening	BSBT-211	Classical Genetics (F)	3(3+0)
6.	BS Morning	STAT-204	Probability & Biostatistics (F)	3(3+0)
7.	BS Evening	STAT-204	Probability & Biostatistics (F)	3(3+0)
8.	M.Sc. Morning	Biotech-10	Cell and Tissue Culture	3(2+1)
9.	M.Sc. Evening	Biotech-10	Cell and Tissue Culture	3(2+1)
10.	BS Morning	BSBT-304	Agriculture Biotechnology. (M)	3(2+1)

Postgraduate Level

1. **PH-BT002-Molecular Biology and Recombinant DNA Technology**
2. **PH-BT005-Tools and Techniques in Biotechnology**

PhD level:

1. **IBT-PhD-6 Recent Advances in Plant Biotechnology**
2. **IBT-PhD-10 Genomics**

Research Projects completed

S. NO	TITLE AND PLACE OF RESEARCH	DONOR AGENCY	AMOUNT (RS/$)	DURATION		ROLE AS	
				FROM	TO	PI	CO.PI
1	Disease Free Seed Potato Production Through Biotechnology	B. Z. University Multan Pakistan.	Rs. 1,50,000	2008	2010	PI	Nil
2	Mapping QTLs associated with heat tolerance in cotton using microsatellite markers	B. Z. University Multan Pakistan.	Rs. 3,24,870	2015	2017	PI	Nil
3	Identification of novel source of salt tolerance in diverse rice germplasm trough molecular approaches	HEC	Rs. 2,55,200	2015	2016	-	Co-PI
4	Biosprospecting the rhizosphere of noxious weed for potent plant growth promoting rhizobacteria	HEC	Rs. 4,80,000	2017	2019		Co-PI

Foreign Trainings:

Name & Place	Type of training	Year attended		Certificate or Diploma obtained
		From	To	
Mounir G. AbouHaidar Professor of Virology University of Toronto Dept. Cell & Systems Biology 25 Willcocks St. Toronto, ON, Canada, M5S 3B2 Phone: 416 978 5615, Fax: 416 978 5878 http://www.csb.utoronto.ca/faculty/index.cfm?fmMode=facultyProfile&prof_id=2	Post-Doctoral	**2-July-2012**	**date**	
Dr. Peng W. Chee **Cotton Molecular Breeding lab** **University of Georgia, Tifton campus, NESPAL building, Georgia USA.** **http://www.nespal.org/peng_lab/former%20lab%20members.html**	**Pre-doctoral Research in Plant Biotechnology & Genomics**	**14-Dec-2005**	**7-Jul-2007**	**Certificate Obtained**

National Trainings:

Name & Place	Type of training	Year attended		Certificate or Diploma obtained
		From	To	
Center of Agriculture Biochemistry & Biotechnology. Uni. Agric. Faisalabad	**Training course on application of Biotechnology in Agriculture**	**7th Dec. 1998**	**12th Dec. 1998**	**Certificate Obtained**
Center of Agriculture Biochemistry & Biotechnology. Uni. Agric. Faisalabad	**National Training course on Integration of Biotechnology and conventional techniques for crop improvement**	**7th Jan, 2002**	**12th Jan, 2002**	**Certificate Obtained**

Plant Genomic Lab Activity at Institute of Molecular Biology & Biotechnology

The availability of a large number of genetically anchored DNA markers has allowed us to study genome organization and evolution in Agricultural crops especially polyploid cotton and the inheritance of traits important to cotton production. Some of our current Research Projects activities are listed below.

1. ***Estimation of Genetic Diversity and Phylogenetic relationship.***

The main goal of research in Plant Genomics lab is to assess and analyze the degree of genetic diversity among different genotypes and varieties of different economical crops such as wheat, cotton, rice, citrus, mango etc. Microsatellite molecular marker (SSR) techniques are used to evaluate and characterize diversity and phylogenetic relationship among them.

2. ***Molecular Breeding, QTLs Mapping and Genetic dissection of Quantitative traits in Polyploid cotton***

Genome Mapping lab is engaged in to identify and characterize QTLs particularly for abiotic stresses, e.g. salinity, drought, heat and water stress. The aim of molecular breeding program is to improve productivity, quality, sustainability, to drought, heat, water stress cotton germplasm. Utilizing molecular markers for assisting breeding and mapping of Quantitative Trait Loci (QTL) for important traits and using proper statistical analysis tools such as QTLs map maker and QTL cartrographer to associate markers linked to candidate genes.

3. ***Phenotypic and molecular screening of Cotton germplasm for resistance to leaf curl Disease (CLCcD) and QTLs Identification for CLCcD.***

Cotton leaf curl disease (CLCuD), a major threat to the cotton industry, has a complex etiology. Despite the identification and involvement of Cotton leaf curl virus (CLCuV, genus Begomovirus) and additional different satellite DNA molecules termed as DNA b and DNA 1 with CLCuD, the precise causative agents appear to be unclear. Our research group extensively involved in Phenotypic and molecular screening of Cotton germplasm for resistance to leaf curl Disease (CLCuD) and QTLs Identification for CLCuD.

Skills and Expertise

Actively involved in Plant Genome Mapping lab, phenotyping, genotyping, data collection, Generation of mapping population from crosses, grouping of the mapping populations according to their phenotypes. Identification of PCR-based molecular markers. Crop improvement via marker assisted selection. Testing of MAS.

Complete skill in all steps involved in gene cloning, for example mini, prep, primer designing, PCR, restriction, ligation, plasmid isolation and RNA isolation, preparation of heat shock and electro-competent cells of E. coli and Agrobacterium, bacterial transformation Sequence alignment, CLUSTALW, BLAST, Exploration of databases, Very Good understanding of computer and internet, Windows application, use and manipulation of a lot of different software, web browsing and internet surfing. Can use excel spread sheet for statistical analysis. Minitab, QTL map mapmaker, QTL Cartograph for mapping , NTsys Pc for diversity analysis.

Referees

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