

CURRICULUM VITAE

Dr. Ayaz Ali Keerio

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Profile

Young Plant Breeder with over six year's research and one year teaching experience in Conventional Breeding and Molecular Breeding and Genetics, and experience in management and handling of plant materials. Possess strong analytical and problem-solving skills with the ability to make well thought out decisions. Proven ability in molecular data analysis, QTL (Quantitative Trait Loci) mapping, GWAS (Genome-wide Association Studies) analysis, experimentation and statistical data analysis. Interested to research on finding genomic regions carrying desirable genes associated with stress tolerance in major crops (Cotton, Wheat, Rice, and Maize), functional and expression analysis of these genes.

Personal information

Date of Birth	:	1 st January 1989
Marital Status	:	Married
Nationality	:	Pakistani
Passport No.	:	AE4999601
Countries visited	:	China, Saudi Arabia, Thailand, Sri Lanka
Researchgate	:	https://www.researchgate.net/profile/Ayaz_Keerio2
Google Scholar	:	https://scholar.google.com.pk/citations?user=nCpf9Z8AAAAJ&hl=en
Academia	:	https://hzau.academia.edu/AyazAliKeerio
Citations	:	47
Impact factor	:	19.488

Academic background

Certificate/Degree (Major subject)	Board/University	Year	Grade/ CGPA/ %
PhD (Crop Genetics & Breeding)	Huazhong Agricultural University, Wuhan	2018	1 st division
M.Sc. (Agri.) Hons. (Plant Breeding & Genetics)	Sindh Agriculture University, Tandojam	2013	88.24%
B.Sc. (Agri.) Hons. (Plant Breeding & Genetics)	Sindh Agriculture University, Tandojam	2011	72.73% / CGPA 3.39
HSC/ Intermediate (Pre-Medical)	B.I.S.E. SUKKUR	2006	“C” Grade/ 56.27%
SSC/ Matriculation (Science)	B.I.S.E. SUKKUR	2004	“B” Grade/ 60.58%

Experience & Research Work

1. **Assistant Professor**, Department of Plant Breeding and Genetics, from **15-2-2019** to **14-2-2020**, under Interim Placement for Fresh PhDs (IPFP) program of Higher Education Commission (HEC).
 - Subjects taught during this period:
 1. **Bioinformatics**= BSIT P-III, in Information Technology Center
 2. **Principles of Plant Breeding**= B.Sc. P-IV in Faculty of Crop Production
 3. **Internship and Report Writing**= B.Sc. P-IV in Faculty of Crop Production
 4. **Hybrid Seed Production of Field Crops**= M.Sc. P-I (Second Semester) in Faculty of Crop Production
 5. **Introductory Genetics**= B.Sc. P-I in Faculty of Crop Protection
 6. **Breeding of Pulse Crops**= B.Sc. P-IV in Faculty of Crop Production
2. **Ph.D. and Masters experience**: Five years' research experience in Laboratory and field conditions during Ph.D. and Masters studies.

Ph.D Thesis Title:

QTL mapping for yield and fiber quality traits based on introgression lines derived from *Gossypium hirsutum* × *G. tomentosum*

M.Sc. Thesis Title:

Performance of wheat genotypes for drought tolerance at early seedling growth stages evaluated under osmotic stress conditions

3. **Research Assistant**, in the HEC-funded research project entitled “Characterization of Spring Wheat Cultivars for Drought Tolerance on the Basis of Physiological and Yield Traits” in the Department of Plant Breeding and Genetics, Sindh Agriculture University, Tandojam, from **18-07-2012** to **17-07-2014**.

Research activities during project

- Wheat genotypes were grown in field to assess their drought tolerance at anthesis stage.
 - Wheat genotypes were also exposed to drought stress at seedling stage imposed by PEG in the Laboratory conditions.
 - F₂ seed was grown for genetic analysis such as heritability, combining ability (SCA and GCA), correlation and regression analysis in wheat.
 - Conducted National Coordinating Varietal Trial (NCVT) in the field to assess the performance of pipeline cotton genotypes based on yield and fiber traits.
 - Hybridization program was carried out in cotton (*Gossypium hirsutum* L.) and wheat (*Triticum aestivum* L.) genotypes to improve the performance of pre-existing varieties.
 - Genetic analysis was also carried out in developed F₁ hybrids of wheat and cotton.
 - Worked on report writing, documentation and drafting of the project.
4. **Internee**, for three months at Nuclear Institute of Agriculture (NIA), Tandojam under internship program offered by Sindh Agriculture University, Tandojam.

Research activities during internship period

1. Conducted experiments to observe the effect of heat stress on yield and yield associated traits in wheat. Twenty wheat genotypes were assessed for heat tolerance on the basis of phenological, yield and physiological traits.
2. Germplasm characterization of wheat genotypes for morphological and phenological traits. Germplasm was comprised of 304 genotypes.
3. Hybridization program (conventional breeding) was carried out for genetic improvement of wheat varieties.

Scientific research publications (*Published*)

2020

1. Ghulam Mustafa Wassan, Hira Khanzada, Qinghong Zhou, Annaliese S. Mason, **Ayaz Ali Keerio**, Saba Khanzada, Abdul Malik Solangi, Muhammad Faheem, Haohua He. 2020. Identification of genetic variation for salt tolerance in *Brassica napus* using genome wide association mapping. *Molecular Genetics and Genomics*. (**Impact Factor 2.879**). **Accepted**
2. Abdul Malik Solangi; Hira Khanzada; Ghulam Mustafa Wassan; Adnan Rasheed; Xiaohua Pan; **Ayaz Ali Keerio**; Jianmin Bian; Majeeduddin Solangi; Rui Cai Han; He Xunfeng; Ziming Wu. 2019. Genetic Mapping and Identification of New Major Loci for Tolerance to Low Phosphorus Stress in Rice. *Physiology and Molecular Biology of Plants*. 26(9): 1897-1910. (**Impact Factor 2.005**).
3. Khanzada, H., Wassan, G.M., He, H., Mason, A.S., **Keerio, A.A.**, Khanzada, S., Faheem, M., Solangi, A.M., Zhou, Q., Fu, D. and Huang, Y., 2020. Differentially evolved drought stress indices determine the genetic variation of *Brassica napus* at seedling traits by genome-wide association mapping. *Journal of Advanced Research*, 24: 447–461. (**Impact Factor 6.992**)
4. Ahmed MM, Akram MW, Tahir MHN, Hussain SB, Ali J, **Keerio AA** and Abbas A, 2020. Genetics and association of yield contributing characters for achene yield in sunflower (*Helianthus annuus* L.). *Agrobiological Records*, 1: 26-30.

2019

5. Ullah, A., M. Nisar, H. Ali, A. Hazrat, K. Hayat, **A. A. Keerio**, M. Ihsan, M. Laiq, S. Ullah, S. Fahad and X. Yang. 2019. Drought tolerance improvement in plants: an endophytic bacterial approach. *Environmental Science and Pollution Research*, 103(18):7385-7397. (**Impact Factor 3.056**).

2018

6. **Keerio, A.A.**, Shen, C., Nie, Y., Ahmed M.M., Zhang, X. and Lin, Z. QTL mapping for fiber quality and yield traits based on introgression lines derived from *Gossypium hirsutum* × *G. tomentosum*. *International Journal of Molecular Sciences*, 2018, 19(1), 243. (**Impact Factor 4.556**).
7. Keerio, A.A., G.S. Mangrio, M.I. Keerio, N.S. Soomro, G.S. Nizamani, S.A. Soomro, A. Khatir, F.D. Soomro, **A.A. Keerio**, A.A. Sheikh, H. Manghwar and Q. Rattar. 2018. Effect of different phytohormones on micro-propagation of banana (*Musa sp.*) cultivars and their assessment through RAPD. *Pure Appl. Biol.*, 7(3): 1074-1084.
8. Rasheed, A., S. Ahmed, G.M. Wassan, A.M. Solangi, M. Aamer, H. Khanzada, **A.A. Keerio**, A. Qadeer and I. Ahmed. 2018. Estimation of hybrid vigor for yield and yield

related traits in tomato (*Solanum lycopersicon* Mill). *International Journal of Biosciences*, 12 (1): 160-167.

2016, 2015, 2014

9. Baloch, M. J., Channa, G. M., Jatoi, W. A., Baloch, A. W., Rind, I. H., Arain, M. A., and **Keerio, A. A.** (2016). Genetic characterization in 5×5 diallel crosses for yield traits in bread wheat. *Sarhad Journal of Agriculture*, 32(3): 127-133.
10. Baloch, M.J., R.Z. Butt, W.A. Jatoi., I.H. Rind, F.M. Halo and **A.A. Keerio**. 2015. Inheritance of polygenic traits in intra-hirsutum F₂ populations. *Journal of Agricultural Research*, 53(4): 491-505.
11. Baloch, M.J., N. Gandahi, W.A. Jatoi, R.Z. Butt, I.H. Rind, F.M. Halo and **A. A. Keerio**. 2014. Genetic Constitution of Multigenic Traits in F₂ Populations of Intrahirsutum Crosses. *Acta Advances in Agricultural Sciences*, 2(2): 35-47.

Scientific abstracts presented (Oral/poster)

12. Keerio, T. A, A. A. Soomro, M. N. Kandhro, S. N. Mari, M. I. Keerio, **A. A. Keerio** and J. M. Keerio. Effects of sowing dates on growth and yield of maize varieties. 4th International Conference on Agriculture, Food and Animal Sciences (ICAFAS-2019) held on 21-22 January 2019 at Sindh Agriculture University, Tandojam. **Oral Presentation**

Key skills in the field of Molecular Genetics and Breeding

1. DNA extraction (CTAB and Plant Kit methods)
2. Gel electrophoresis
3. DNA marker analysis
4. QTL analysis
5. Genome wide association studies (GWAS) analysis (including population structure, linkage disequilibrium, GLM and MLM models)
6. PCR (Polymerase Chain Reactions), Real-time PCR and reverse-transcription RT-PCR
7. Gel Electrophoresis (Agarose and PAGE)
8. Marker Assisted Back Crossing (MABC)
9. Marker Assisted Recurrent Selection (MARS)

Research and teaching interest within the Plant Breeding and Genetics, and Molecular Genetics

- Breeding of Field Crops such as Cereals; (Wheat, Maize, Millet and Sorghum), Oilseeds & Tobacco, Fiber, Fodder & Forages, Legumes, Pulses and Sugar Crops
- Advanced Methods in Plant Breeding
- Cytogenetics of Crop Plants
- Advanced Genetics
- Genetic Engineering of Crop Plants
- Principles of Plant Breeding
- Experimentation
- Non-conventional approaches to Crop Improvement
- Elements of Crop Ecology
- Reproductive System in Crop Plants
- Methods of Biometry in Genetics
- Genetics of Crop Plants

- Insects in Relation to Plant Diseases
- Hybrid Seed Production of Field Crops

Certificates awarded (in chronological order from latest to oldest)

1. Participated in an online national webinar on “**Effects of Magnetic Field on the Living System of Earth**” held on 25th November 2020, organized by PG Department of Geography and Environmental Science, GSSDGS Khasala College, Patiala, India.
2. Participated in an online international webinar on “**From breeding to genome editing: long-term strategies to contain plant diseases**” held on 24th November 2020, organized by Bioingene.com.
3. Participated in an online workshop on “**Artificial Intelligence Workshop**” held on 20th November 2020, organized by WAMY CLUB, International Islamic University, Malaysia.
4. Participated in 1st International Symposium on “**Current Trends and Future Perspectives in Botanical Research**”, held on 10th November 2020, organized by Department of Botany, University of Okara, Okara-Pakistan.
5. Participated in an online Webinar on “**Plagiarism in Research**” held on 10th November, 2020, organized by Department of Civil Engineering, Anjuman Institute of Technology and Management, Visvesvaraya Technological University Belagavi, India.
6. Participated in an online international webinar on “**MirRORs (miRNA Regulation of response) to salt stress in plants**” held on 13th October 2020, organized by Bioingene.com.
7. Participated in an online international webinar on “**Harnessing transcriptome resources of non-crop models for improving stress resilience in rice**” held on 8th October 2020, organized by Bioingene.com.
8. Participated in a Two Days YouTube Live Workshop in “**Factor and Cluster Analysis using SPSS**” during September 25-26-2020, organized by CRACK ECONOMICS AND STATISTICS YouTube Channel.
9. Participated in the “**International Webinar on Plant Physiological Paradigms towards Agricultural Sustainability Under Climate Change**” organized by Bihar Agricultural University, Sabour, Bhagalpur held on September 15, 2020.
10. Participated in the one-day workshop on “**Writing a Scientific Research Paper**” held on 15th September, organized by Pakistan Scientific and Technological Information Centre (PASTIC).
11. Participated in an “**International Quiz on Applications of Artificial Intelligence**” on 15-09-2020 organized by Parul Institute of Computer Application, Faculty of IT and Computer Science, Parul University.
12. Participated in an international webinar on “**CRISPR in Agriculture: Context of Improving WUE**” held on 12th September 2020, organized by Bioingene.com.
13. Participated in “**1st Virtual Safe Use Ambassador Conference**” on BAYER SAFE USE AMBASSADOR theme, on 8th September 2020, organized Byer Crop Science.
14. Participated in an international webinar on “**The Importance of Soft Skills in Academia**” held on 5th September 2020, organized by Bioingene.com.
15. Participated in an international webinar on “**MicroProteins: Novel tool to bioengineer future ready plants**” held on 17th August 2020, organized by Bioingene.com.
16. Participated in an international webinar on “**Role of Agricultural & Environmental Biotechnology for a Sustainable Future**” held on 11th August 2020, organized by Bioingene.com.

17. Participated in an international webinar on “**Mainstreaming underutilized crops: The story of foxtail millet**” held on 6th August 2020, organized by Bioingene.com.
18. Attended an international conference on “**Agricultural Genomics 2017: Functional Genomics towards Green Crops for Sustainable Agriculture**” held on 25-27 October 2017, National Key Laboratory of Crop Genetic Improvement, Huazhong Agricultural University, Wuhan, P.R. China.
19. Participated in “**First Annual Academic Symposium for International Students**”, held on January 6, 2016 at Huazhong Agricultural University, Wuhan, P.R. China.
20. Attended “**3rd International Conference on Agriculture, Food and Animal Sciences (ICAFAS)**”, held on 10-11 January 2017 at Sindh Agriculture University Tandojam.
21. Participated in two days’ workshop on “**CROP DISEASE MANAGEMENT THROUGH ADVANCE BREEDING METHODS**” held on 24-25 September 2013, organized by Plant Breeding & Genetics division, Nuclear Institute of Agriculture (NIA), Tandojam.
22. Participated in “**ONE WEEK ORIENTATION COURSE ON GENETIC IMPROVEMENT OF CROPS**”, held on MAY 09-13, 2011, organized by Plant Breeding & Genetics division, Nuclear Institute of Agriculture (NIA), Tandojam.
23. **Certificate of internship**: Completed three-month internship (03-01-2011 to 31-03-2011) at Plant Breeding and Genetics Division, Nuclear Institute of Agriculture (NIA) Tando Jam.

Seminars attended (physical mode)

1. Transgenic crops: New Era of Agriculture Biotechnology, Opportunities and Challenges for a Developing Country. Held on May 17 2013, jointly organized by Nuclear Institute of Agriculture (NIA), Tandojam and Pakistan Biotechnology Information Center (PABIC) at NIA, Tandojam.
2. Current status of plant diseases on important crops in Sindh. Delivered by Dr. Javed Asghar, Principal Scientist. Organized by Nuclear Institute of Agriculture (NIA), Tandojam.
3. Wheat breeding for rust resistance in wheat. Delivered by Dr. Richards W. Ward, CIMMYT representative for wheat in Pakistan. Organized by Nuclear Institute of Agriculture (NIA), Tandojam.
4. New Stem rust race: Challenge for sustainable wheat production. Delivered by Mr. Salman Ahmed, Junior Scientist. Organized by Nuclear Institute of Agriculture (NIA), Tandojam.
5. Mango sudden death syndrome causes and precautionary measures. Delivered by Mr. M. Ismail. Junior Scientist. Organized by Nuclear Institute of Agriculture (NIA), Tandojam.

Expertise in Experimental Layout

1. Randomized Complete Block Design (RCBD)
2. Completely Randomized Design (CRD)
3. Split Plot Design
4. Factorial Design
5. Augmented design

Expertise in Genotypic and Phenotypic Data Analysis

1. QTL mapping

2. Genome-wide association studies (GWAS)
3. Population structure
4. Kinship
5. Analysis of variance (ANOVA)
6. Heritability
7. General Combining Ability (GCA) and Specific Combining Ability (SCA)
8. Genotypic and phenotypic correlations
9. Histogram and Box plot analysis
10. Factor and cluster analysis

Computer expertise

- ▣ Microsoft Word
- ▣ Microsoft Power Point
- ▣ Microsoft Excel
- ▣ Microsoft Teams

Statistical software Packages for Data Analysis

- ▣ QTL ICIMapping v. 4.1
- ▣ Windows QTL cartographer v. 2.5
- ▣ TASSEL v. 5.1
- ▣ PLINK
- ▣ Burrows-Wheeler-Aligner (BWA) v0.7.10
- ▣ Genome Analysis Toolkit (GATK) software
- ▣ Admixture
- ▣ Structure
- ▣ R-programing language
- ▣ CIRCOS v0.66
- ▣ SPSS v.20
- ▣ Minitab v.18
- ▣ MATLAB
- ▣ Sigma Plot
- ▣ SAS v.9
- ▣ Statistix 8.1 version
- ▣ MSTATC
- ▣ Statistic software (SAS, STATISTICA-Version 5.5)
- ▣ DNAMAN

Gene database websites and packages for primer designing

- ▣ NCBI webpage
- ▣ TAIR (The Arabidopsis Information Resources) databases
- ▣ CottonGen database (<https://www.cottongen.org>)
- ▣ Primer premier 5/6
- ▣ UltraEdit software
- ▣ Bioedit software
- ▣ Notepad 6.9

Reference citations

- ▣ EndNote versions X7, X9

Articles published in local language

1. **Effect of temperature on wheat growth and yield.** Published in monthly magazine **SINDH ZARAIT**, March edition 2011.
2. **Wheat harvesting.** Published in monthly magazine **SINDH ZARAIT**, April edition 2011.
3. **Problems related to Agriculture and need for their solution.** Published in monthly magazine **SINDH ZARAIT**, April edition 2011.
4. **Need of crop improvement in Agriculture.** Published in monthly magazine **SINDH ZARAIT**, April edition 2011.

Languages spoken and written

	Reading	Writing	Understanding & Speaking
ENGLISH	Excellent	V. Good	V. Good
URDU	Excellent	Excellent	Excellent
SINDHI	Excellent	Excellent	Excellent

References

1. Dr. Zhongxu Lin, Ph.D

Professor

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2. Dr. Shah Nawaz Mari, Ph.D

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