Curriculum Vitae

Dr. Muhammad Sajjad, *Ph.D.*
Tenured Associate Professor

Department of Biosciences,
COMSATS University Islamabad,
Park Road, Islamabad

***Visiting Scientist* (*CAS-PIFI Fellow*)**
CIB, Chengdu, (2023-24)

Post doctorate (CAS-PIFI)
IGDB, Beijing (2015-2017)

PERSONAL DETAILS

Name: Muhammad Sajjad
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Permanent address: House# 166, Street# 47, Sector F-10/4, Islamabad, Pakistan
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RESEARCH INTERESTS

Plant genetics, genomics, and genome editing.

My research focuses on bridging the gap between the genome, transcriptome, and phenome in crop plants. I employ cutting-edge AI, genetics, genomics, and transcriptomics tools to understand these interconnected aspects and utilize the CRISPR Cas9 system for genome editing in plants.

BIOGRAPHY

Dr. Muhammad Sajjad holds the position of 'Tenured Associate Professor' in the Department of Bioscience at COMSATS University Islamabad, Pakistan. He is also a member of the National Center for Genome Editing (NCGE). Dr. Sajjad's research interests revolve around enhancing yield potential, stress tolerance, and nutritional quality in cereals by leveraging the latest genetics, genomics, and genome editing tools. He earned his PhD from the University of Agriculture, Faisalabad, with an international fellowship at ARS-USDA, California. Following that, he pursued a postdoctoral fellowship at IGDB, CAS, Beijing (2015-2017), and successfully completed his CAS-PIFI fellowship at CIB, CAS in 2023.

Dr. Sajjad is renowned for his discoveries of novel yield and quality-related genes in bread wheat, along with the development of user-friendly markers for marker-assisted selection (MAS) in wheat. He has also devised a protocol for the discovery and haplotyping of multiple genes within a vast collection of accessions in bread wheat, which has been filed for a patent in Beijing. Additionally, he has introduced a simplified method for preserving wheat pollen grains and developed first ***high amylose wheat line*** *in Pakistan. Dr. Sajjad's contributions to the field are reflected in his extensive publication record, with over 80 research articles in SCI journals.*

Furthermore, he serves as an editor for Frontiers in Genetics, Frontiers in Plant Science and Gene. He actively participates as a member of breeders' teams dedicated to the development of new wheat, barley and rice varieties. Currently, Dr. Sajjad is leading three projects in the realm of cereal genetics and genomics, one as a Principal Investigator (PI) and the others as a Co-Principal Investigator (Co-PI). He also mentors a team of 4 MS students and 2 PhD students. To complement his research, Dr. Sajjad has contributed significantly to education, having taught a diverse range of 13 undergraduate and graduate courses, consistently achieving an average teaching score of over 90%.

ACADEMIC RECORD

Ph.D, Plant Breeding and Genetics (1st Division)
Aug. 2007-Feb. 2013
University of Agriculture Faisalabad/ ARS-USDA Albany, California
Thesis title: Association mapping of yield traits in wheat (*Triticum aestivum* L.)

M.Sc (Hons), Plant Breeding and Genetics (1st Division)
Sep. 2005- Aug. 2007
University of Agriculture, Faisalabad, Pakistan
Thesis title: Genetic Diversity and Phylogenetic Relationships among Existing Sugarcane Cultivars in Pakistan.
Marks: 77.55%, CGPA: 3.58/4

B.Sc (Honours), Plant Breeding and Genetics (1st Division)
Dec. 2001- Aug. 2005
Internship Research Title: DNA/Protein Profiling of Wheat Cultivars
University of Agriculture, Faisalabad, Pakistan
Marks: 82.32%, CGPA: 3.92/4

Higher Secondary Certificate (1st Division)
1998-2001
Government Degree College Gojra (Pakistan)
Subjects (major): Biology, Chemistry, Physics, English
Marks: 69.99 %

Secondary School Certificate (1st Division)
7th July 1998 Government High School, 160 G.B, Gojra (Pakistan)
Subjects (major): Biology, Mathematics, Physics, Chemistry, English
Marks: 75.53 %

JOB RECORD

Tenured Associate Professor
July 2021 to present
Department of Biosciences
COMSATS University Islamabad, Islamabad Campus.

Assistant Professor
May 2019 to July 2021
Department of Biosciences
COMSATS University Islamabad, Islamabad Campus.

Assistant Professor
August 2014 to May 2019
Department of Environmental Sciences
COMSATS University Islamabad, Vehari Campus.

Assistant Professor
June 2013 to June 2014
Department of Plant Breeding and Genetics
PMAS, Arid Agriculture University, Rawalpindi

PATENT

Liu Dongcheng, Zhang Aimin, Ma Xiaoling, Yu Kang, **Muhammad Sajjad**, Yu Kang, Yang Wenlong. A Novel Method for Gene/Allelic Variation in Polyploid Plant Species Using Third Generation Sequencing Platform (PacBio RS II). Chinese Patent, 201710214678. 3, Filed on 1st April 2017.

PUBLICATIONS

Journal Articles

66Zulfiqar, S., Ishfaq, S., Bukhari, S. A. R., **Sajjad, M**., Akhtar, M., Liu, D., & Rahman, M. (2024). New genetic resources for aphid resistance were identified from a newly developed wheat mutant library. Heliyon, 10(5), e26529. https://doi.org/10.1016/j.**Heliyon**.2024.e26529

65Khan, I.; Naeem, M.K.; Shahzad, A.; Zhang, Z.; Chen, J.; **Sajjad*, M**. Optimizing Wheat Pollen Preservation for Enhanced Viability and In Vitro Germination. ***Agronomy*** 2024, 14, 201. https://doi.org/10.3390/agronomy14010201

64Awais Rasheed, Saman Maqbool, Samar Naseer, Nageen Zahra, Fatima Rasool, Humaira Qayyum, Khawar Majeed, Muhammad Jahanzeb, Muhammad Naeem, Muhammad Khan, Hao Zhang, Huihui Li, MUHAMMAD **SAJJAD**, and Muhammad Fayyaz. 2023. RNAseq of diverse spring wheat cultivars released during last 110 years. ***Scientific Data***. 10, 884 (2023). https://doi.org/10.1038/s41597-023-02769-w

63Akila Wijerathna-Yapa, Ruchi Bishnoi, Buddhini Ranawaka, Manu Maya Magar, Hafeez Ur Rehman, Swati G. Bharad, Michal T. Lorenc, Vinita Ramtekey, Sasha Gohar, Charu Lata, Md. Harun-Or-Rashid, Maryam Razzaq, Muhammad **Sajjad**, Bhoja R. Basnet, 2023. Rice–wheat comparative genomics: Gains and gaps, ***The Crop Journal***. https://doi.org/10.1016/j.cj.2023.10.008

62Zafer MZ, Tahir MHN, Khan Z, **Sajjad M**, Gao X, Bakhtavar MA, Waheed U, Siddique M, Geng Z, Ur Rehman S. Genome-Wide Characterization and Sequence Polymorphism Analyses of Glycine max Fibrillin (FBN) Revealed Its Role in Response to Drought Condition. ***Genes***. 2023; 14(6):1188. https://doi.org/10.3390/genes14061188

61Farooq, A., Khan, U.M., Khan, M.A. Ali Z, Maqbool R, **Sajjad* M**. Male sterility systems and their applications in hybrid wheat breeding. ***CER RES. COMMUN.*** (2023). https://doi.org/10.1007/s42976-023-00376-4

60Mehvish, 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 GWAS. ***Plants*** 2023, 12, 1610. https://doi.org/10.3390/ plants12081610

59Khan I, Wu J and Sajjad M (2022) Pollen viability-based heat susceptibility index (HSIpv): A useful selection criterion for heat-tolerant genotypes in wheat. ***Front. Plant Sci.*** 13:1064569. https://doi:10.3389/fpls.2022.1064569

58Gohar S, **Sajjad M**, Zulfiqar S, Liu J, Wu J and Rahman M-u (2022), Domestication of newly evolved hexaploid wheat—A journey of wild grass to cultivated wheat. ***Front. Genet.*** 13:1022931. https://doi:10.3389/fgene.2022.1022931

57Nisar T, Tahir MHN, Iqbal S, **Sajjad M**, Nadeem MA, Qanmber G, Baig A, Khan Z, Zhao Z, Geng Z and Ur Rehman S (2022) Genome-wide characterization and sequence polymorphism analyses of cysteine-rich poly comb-like protein in Glycine max. ***Front. Plant Sci.*** 13:996265. https://doi:10.3389/fpls.2022.996265

56Ashfaq, M., Rasheed, A., **Sajjad, M**. et al. Genome wide association mapping of yield and various desirable agronomic traits in Rice. ***Mol Biol Rep*** (2022). https://doi.org/10.1007/s11033-022-07687-5

55Ahmad I, Rana RM, Hassan MU, Khan MA, **Sajjad M**. Association mapping for abiotic stress tolerance using heat- and drought-related syntenic markers in okra. ***Mol Biol Rep***. 2022 Aug 12. https://doi: 10.1007/s11033-022-07827-x

54Taj M, **Sajjad* M**, Li M, Yasmeen A,Mubarik MS, Kaniganti S and He C (2022) Potential Targets for CRISPRCas Knockdowns to Enhance Genetic Resistance Against Some Diseases in Wheat (*Triticum aestivum* L.). ***Front. Genet.*** 13: 926955. https://doi://10.3389/fgene.2022.926955

53Khan, S.H., **Sajjad*, M**., Gulnaz, S. et al. Genetic dissection of grain yield traits in a large collection of spring wheat (Triticum aestivum L.) germplasm. ***J. Crop Sci. Biotechnol.*** 25, 215–223 (2022). https://doi.org/10.1007/s12892-021-00124-2

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51Zaheer M, Rehman S, Khan SH, Shahid S, Rasheed A, Naz R, **Sajjad* M**. (2021). Characterization of new COBRA like (COBL) genes in wheat (*Triticum aestivum*) and their expression analysis under drought stress. ***Mol Biol Rep***. Feb;49(2):1379-1387. https://doi.org/10.1007/s11033-021-06971-0

50Rehman S, Ali Sher M,Saddique MAB, Ali Z, Khan MA,Mao X, Irshad A, **Sajjad M**, Ikram RM,Naeem M and Jing R (2021). Development and Exploitation of KASP Assays for Genes Underpinning Drought Tolerance Among Wheat Cultivars From Pakistan. ***Front. Genet.*** 12:684702. https://doi.org/10.3389/fgene.2021.684702

49Hu X, Yang M, Gong S, Li H, Zhang J, **Sajjad M**, Ma X, Yuan D. (2021) Ethyleneregulated immature fruit abscission is associated with higher expression of CoACO genes in *Camellia oleifera*. ***R. Soc. Open Sci.*** 8: 202340. https://doi.org/10.1098/rsos.202340

48Bakhat, H.F., Arshad, S., Natasha, Abbas, S., Shah, G.M., Fahad, S., Hammad H. M., **Sajjad, M**., Ashfaq, M., Shahid, M. 2022. Genotypic Differences Among the Rice Genotypes to Arsenic Stress Cultivated Under Two Water Regimes: With an Inference to Human Health. **J Plant Growth Regul** 41, 558–568. https://doi.org/10.1007/s00344-021-10321-6

47Mubarik, M.S., Khan, S.H., **Sajjad, M**., Raza, A., Hafeez, M.B., Yasmeen, T., Rizwan, M., Ali, S. and Arif, M.S. (2021), A manipulative interplay between positive and negative regulators of phytohormones: A way forward for improving drought tolerance in plants. ***Physiol Plant***. 2021 Jun;172(2):1269-1290. https://doi.org/10.1111/ppl.13325

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45Arain S, M. Meer**, M. Sajjad**, H Yasmin. 2021. Light contributes to salt resistance through GAI protein regulation in Arabidopsis thaliana. ***Plant Physiology and Biochemistry*** 159 (2021) 1–11. https://doi.org/10.1016/j.plaphy.2020.12.004

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42Rasheed A, M. Ashfaq, **M. Sajjad.** 2021. Combining ability and heterosis analysis for grain yield traits in fine long grain rice (*Oryza sativa* l.). ***J. Animal Plant Sci.*** 31(3): 764-772. https://doi.org/10.36899/JAPS.2021.3.0266

41Mubarik MS, Khan SH, Ahmad A, Raza A, Khan Z, **Sajjad M**, Sammour RHA, Mustafa AE-ZMA, Al-Ghamdi AA, Alajmi AH, Alshamasi FKI, Elshikh MS. Controlling Geminiviruses before Transmission: Prospects. ***Plants***. 2020; 9(11):1556. https://doi.org/10.3390/plants9111556

40Shoaib, M., Yang, W., Shan, Q. Sun L, Wang D, **Sajjad M**, Li X,·Sun J, **Liu D**, Zhan K, Zhang A. 2020. *TaCKX* gene family, at large, is associated with thousand-grain weight and plant height in common wheat. ***Theor Appl Genet*** (2020). 133, 3151–3163 https://doi.org/10.1007/s00122-020-03661-6

39Yasmin, H.; Naz, R.; Nosheen, A.; Hassan, M.N.; Ilyas, N.; **Sajjad, M.**; Anjum, S.; Gao, X.; Geng, Z. Identification of New Biocontrol Agent against Charcoal Rot Disease Caused by *Macrophomina phaseolina* in Soybean (*Glycine max* L.). ***Sustainability*** 2020, 12, 6856. https://doi.org/10.3390/su12176856

38Tahir, A., M.K. Ilyas., M.M. Sardar, A.K. Pouya, F. Rasouli, A. Bibi, Z. Jabeen, **M. Sajjad**, S. U. Siddiqui, A. Ghafoor, 2020. Selection criteria for yield potential in a large collection of *Vigna radiata* (L.) accessions. ***Euphytica,*** 216, 138. https://doi.org/10.1007/s10681-020-02675-x

37Sarfraz, M., Hussain, K., Nawaz, K., Yasin, G., Geng, Z., **Sajjad, M**. and Parveen, S. (2020). Determination of Effective Method of NPK Fertilization in Pea (*Pisum sativum* L.) Cultivars Grown in Pakistan. ***Legume Research***. 44: 431-438. DOI: 10.18805/LR-570

36Ahmed, H. G. M.D, Kashif M., **Sajjad M**, Zeng Y.W. 2020. Genetic dissection of protein and gluten contents in wheat (*Triticum aestivum* L.) under normal and drought conditions. ***App. Ecol. Environ. Res.***18(4):5645-5659. http://dx.doi.org/10.15666/aeer/1804_56455659

35Azmat A, Yasmin H, Hassan MN, Nosheen A, Naz R, **Sajjad M**, Ilyas N, Akhtar MN. 2020. Co-application of bio-fertilizer and salicylic acid improves growth, photosynthetic pigments and stress tolerance in wheat under drought stress. **PeerJ** 8:e9960 DOI 10.7717/peerj.996

34Ahmed, H.G. M; **Sajjad, M.**; Zeng, Y.; Iqbal, M.; Khan, S.H.; Ullah, A.; Akhtar, M.N. Genome-Wide Association Mapping through 90K SNP Array for Quality and Yield Attributes in Bread Wheat against Water-Deficit Conditions. ***Agriculture,*** 2020, 10, 392. https://doi.org/10.3390/agriculture10090392

33Muhammad S, **M. Sajjad***, S.H. Khan et al. 2020. Genome wide association analysis for stripe rust resistance in spring wheat (*Triticum aestivum* L.) germplasm. ***J. Integ. Agric.*** 19(8): 2035-2043 https://doi:10.1016/S2095-3119(19)62841-8

32Tayyab N, Naz R, Yasmin H, Nosheen A, Keyani R, **Sajjad M**, et al. (2020) Combined seed and foliar pre-treatments with exogenous methyl jasmonate and salicylic acid mitigate drought induced stress in maize. ***PLoS ONE*** 15(5): e0232269. https://doi.org/10.1371/journal. pone.0232269

31Ma X, X. Li, J. Wang, **M. Sajjad**, H. Xue, W. Yang, D. Liu, J. Sun, A. Zhang. 2020. Transformation of Pinb-D1x to soft wheat produces hard wheat kernel texture. ***J. Cereal Sci.*** 91: 1-7. https://doi.org/10.1016/j.jcs.2019.102889

30Ahmed HGMD, M Kashif, MAR Rashid, **M Sajjad**,Y Zeng (2020). Genome wide diversity in bread wheat evaluated by SSR markers. ***Intl J Agric Biol*** 24:263–272

29Ashfaq M., M.A.Anjum,M.S.Haider, M. Ali, U. Mubashar, U. Bashir1 H.M.U Aslam, **M. Sajjad**. 2020. Association ofcladosporium cladosporioides brown leaf spot of ladypalm in Pakistan. ***J. Animal Plant Sci***. 30(2): 371-376. https://doi.org/10.36899/JAPS.2020.2.0060

28Nadeem, M., Tariq, M. N., Amjad, M., **Sajjad M**., Akram, M., Imran, M. Kulikov, D. (2020). Salinity induced changes in the nutritional quality of bread wheat (Triticum aestivum L.) genotypes. ***AGRIVITA J. Agric. Sci.*** 42(1), 1–12. https://doi.org/10.17503/agrivita.v42i1.2273

27Ahmed HGMD, **M Sajjad**, M Li, MA Azmad, M Rizwan, RH, Maqsood, SH Khan, 2019. Selection Criteria for Drought-Tolerant Bread Wheat Genotypes at Seedling Stage. ***Sustainability***. *11*(9), 2584; https://doi.org/10.3390/su11092584

26Gad M A, Li X, Alam MA, **Sajjad M*,** Li M, 2019. Geographical distribution and virulence phenotypes of Puccinia striiformis f. sp. tritici from wheat in Yunnan, China. ***Sci. Asia.*** 45: 572-580.

25Shoaib M, W Yang, Q. Shan, **M. Sajjad**, A. Zhang, 2019. Genome wide identification and expression analysis of new cytokinin metabolic genes in bread wheat (*Triticum aestivum* L.). ***PeerJ*** 7: e6300

24Ashfaq M., W. Ahmad, MS Haider, M. Ali, **M. Sajjad**, F. Khan, S. Shaheen, M.A. Anjum, U. Mubasher. 2019. Molecular and agronomic characterization of selected rice germplasm under normal and water stress conditions. ***Pak. J. Agric. Sci.*** 56: 29-36.

23Gulnaz, S., M. Zulkiffal, **M. Sajjad***, J. Ahmed, M. Musa, M. Abdullah, A. Ahsan, and A.U. Rehman, 2019. Identifying Pakistani wheat landraces as genetic resources for yield potential, heat tolerance and rust resistance. ***Intl. J. Agric. Biol.*** 21: 520–526

22Shahzad M., S.H. Khan**, M.Sajjad***, A. Rehman, M. Nadeem, A.S. Khan, 2019. Allelic composition at Glu genes in a collection of spring wheat germplasm. ***Bang. J. Botany***, 48(1): 25-31.

21Wattoo, J., S. Liaqat, H. Mubeen, M. Ashfaq, M.N. Shahid, A. Farooq, **M. Sajjad** and M. Arif, 2019. Genetic mapping of grain nutritional profile in rice using basmati derived segregating population revealed by SSRs. ***Intl. J. Agric. Biol.,*** 21: 929–935

20**Sajjad, M*,** S. H. Khan and M Shahzad, 2018. Patterns of allelic diversity in spring wheat populations as revealed by SSRs. ***Cytology & Genetics.*** 52(2): 155-160.

19Shah GM, Nasir M, Imran M, Bakhat HF, Rabbani F, **Sajjad M**, Umer Farooq AB, Ahmad S, Song L. 2018. Biosorption potential of natural, pyrolysed and acid-assisted pyrolysed sugarcane bagasse for the removal of lead from contaminated water. **PeerJ**6:e5672

18Tariq, M., MKN Shah, MU Hassan, **M.Sajjad**, M. Jamil, M. Ali, A.M. Kazi, 2018. Prevalence of higher glutenin variation in synthetic wheat germplasm. ***J. Animal Plant Sci.,*** 28(2): 568-575.

17Muhammad, S., A. Ahmad, A.I. Khan, F.S. Awan, M. Qasim, A. Rehman, A. Rehman, M.A. Javed, I. Manzoor and **M. Sajjad**, 2018. Genome wide association analysis for leaf rust resistance in spring wheat (*Triticum aestivum* L.) germplasm. ***Int. J. Agric. Biol***., 20: 2384–2397

16**Sajjad M**, X. Ma, W. Yang, Ji. Sun D. Liu and A. Zhang, 2017. TaFlo2-A1, an ortholog of rice Flo2, is associated with thousand grain weight in bread wheat (*Triticum aestivum* L.). ***BMC Plant Biology.*** 17:164, 1-11. https://doi.org/10.1186/s12870-017-1114-3

15Ma X., **M. Sajjad**, J. Wanga, W. Yang, J. Sun, A. Zhang, D. Liu, 2017. Diversity, distribution of Puroindoline genes and their effect on kernel hardness in a diverse panel of Chinese wheat germplasm. ***BMC Plant Biology***. 17:158, 1-12. https://doi.org/10.1186/s12870-017-1101-8

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13Ashfaq M., M. A. Anjum, R. Hafeez, A. Ali, M. S. Haider, M. Ali, M. B. Chattha, S. R. Ahmad, F. Ahmad, M. Sajjad. First Report of Fusariumequiseti Causing Brown Leaf Spot of Fishtail Palm (Caryotamitis) in Pakistan. ***Plant Disease*** 101(5): 840.The American Phytopathological Society. USA

12Shehzad M., S.H. khan, A.S. khan, **M. Sajjad**, A. Rehman, A.I. khan, 2016. Identification of QTLs on chromosome 1b for grain quality traits in bread wheat (*Triticum aestivum* L***.). Cytology & Genetics***. 50(2): 13-20.

11Mubarik S, Sultan H. Khan, A Ahmad, Z Khan, **M Sajjad**, IA. Khan. 2016.Disruption of Phytoene Desaturase Gene using Transient Expression of Cas9: gRNA Complex. ***Int. J. Agric. Biol.*** 18(5): 990-996.

10Nadeem M., F. M.Anjum, M. R. Khan, **M.Sajjad**, S. Hussain & M. S. Arshad.2016. Electrophoretic Characteristics of Gluten Proteins as Influenced by Crop Year and Variety. ***Int. J. Food Prop.*** 19(4): 897-910. https://doi.org/10.1080/10942912.2015.1045518

9 Ahmad MQ, S. H. Khan, **M. Sajjad** and I. A. Khan. 2015.Analysis of drought responsive traits in hexaploid wheat (*Triticum aestivum* L.). ***Pak. J. Agri. Sci.,*** Vol. 52(3), 701-707.

8 **Sajjad, M**., S. H. Khan, M. Q. Ahmad, A. Rasheed. A. Mujeeb-Kazi, I. A. Khan 2014. Association mapping identified QTLS on wheat chromosome 3A for yield related traits. ***Cer. Res. Commun***. 42(2): 177-188.

7 Rehman, A, **M. Sajjad**, S. H. Khan, R. J. Peña, N. I. Khan, 2014. Lower tendency of allelic variation of *Glu* genes and absence of 1BL-1RS translocation in modern Pakistani wheats**.** ***Cer. Res. Comm*.** 42(1): 139-150.

6 Ahmad M. F., S. M Shehzad. K. Hussain, S. H. Khan, and **M. Sajjad**. 2014. Influence of *fusarium moniliforme* inoculationon on heterosis and heterobeltiosis for agronomic traits in maize (*Zea mays* L.). ***Int. J. Agric. Biol***. 16: 1041-1049.

5 Rehman, A., **M. Sajjad**, S. H. Khan, M. Nadeem, 2013. Prospects of wheat breeding for durable resistance against brown, yellow and black rust fungi. ***Int. J. Agric. Biol.*** 15(6): 1209-12220.

4 **Sajjad, M.**, S.H. Khan, R. Maqbool, A. Ather and N. Iqbal, 2012. Selection of Pakistani and CIMMYT wheat lines for better grain yield and quality. ***Int. J. Agric. Biol.,*** 14: 645–649

3 Al-Maskari, A. Y., **M. Sajjad** and S. H. Khan. 2012. Association mapping: A step forward to discovering new alleles for crop improvement. ***Int. J. Agric. Biol.*** 14: 153-160.

2 **Sajjad, M.,** S.H. Khan and A.S. Khan, 2011. Exploitation of germplasm for grain yield improvement in spring wheat (*Triticum aestivum*). ***Int. J. Agric. Biol.,*** 13: 695-700.

1 Gulnaz, S., **M. Sajjad,** I. Khaliq, A.S. Khan and S.H. Khan, 2011. Relationship among coleoptile length, plant height and tillering capacity for developing improved wheat varieties. ***Int. J. Agric. Biol.,*** 13: 130-133.

Book Chapters

7 Baloch, F.S. et al. (2022). Origin, Taxonomy, and Distribution of Ancient Wheats in Turkey. In: Zencirci, N., Ulukan, H., Baloch, F.S., Mansoor, S., Rasheed, A. (eds) Ancient Wheats. Springer, Cham. https://doi.org/10.1007/978-3-031-07285-7_3

6 Muhammad Umar Iqbal, Sultan Habibullah Khan, Muhammad Salman Mubarik, Aftab Ahmad, Muhammad Sajjad, Hafiz Muhammad Imran (2022). Cotton Genetics and Genomics. In: Khan, Z., Ali, Z., & Khan, A.A. (Eds.). (2022). Cotton Breeding and Biotechnology: Challenges and Opportunities (1st ed.). CRC Press. https://doi.org/10.1201/9781003096856

5 Mubarik M.S., Khan S.H., **Sajjad M**. (2021) Key Applications of CRISPR/Cas for Yield and Nutritional Improvement. In: Ahmad A., Khan S.H., Khan Z. (eds) CRISPR Crops. Springer, Singapore. https://doi.org/10.1007/978-981-15-7142-8_7

4 Khan S.H., Ghouri MZ, Aslam S, Mubarik MS, Khan Z, Ahmad MQ, **Sajjad M** (2021) Applications of CRISPR/Cas Beyond Simple Traits in Crops. In: Ahmad A., Khan S.H., Khan Z. (eds) CRISPR Crops. Springer, Singapore. https://doi.org/10.1007/978-981-15-7142-8_8

3 Akram R. et al. (2022) Research on Climate Change Issues. In: Jatoi W.N., Mubeen M., Ahmad A., Cheema M.A., Lin Z., Hashmi M.Z. (eds) Building Climate Resilience in Agriculture. Springer, Cham. https://doi.org/10.1007/978-3-030-79408-8_17

2 Arain Saima Mir, Meer Maria, **Sajjad Muhammad** and Sial Mahboob Ali (October 26th, 2020). Potential of Mutation Breeding to Sustain Food Security [Online First], IntechOpen, http://doi.org/10.5772/intechopen.94087

1 Husnu Aktas, Awais Rasheed, **Muhammad Sajjad**, Faheem Shehzad Baloch (2020) Taxonomy, Evolution, Distribution and Origin. In. Nusret Zencirci, Hakan Ulukan, Calvin O Qualset, Mark Nesbitt (eds) Hulled Wheat. Springer International Publishing AG; 1st ed. 2018 edition. ISBN-13: 978-3319998039

PROJECTS

S.No	Project Title	Duration	Amount (million PKR)	Funding Agency	Present Status/Role
10.	Green Tcchnology Integration and Mode Construction of Highland Barley in Tibet	2023-2026	40	Sichuan Province Regional Innovation Cooperation	Ongoing/CoPI
9.	Cultivation of Major New Varieties of Green and High efficiency Whcat	2023-2026	20	Sichuan Province Regional Innovation Cooperation	Ongoing/CoPI
8.	Adapting to Climate Change through	2023-	25	Asia Pacific Network (APN)	Ongoing/Collab

	Climate Smart Agricultural Practices in Water-limited Landscapes in South Asia	2025			orator
7.	Application of genomic assays for the development of improved wheat genotypes—varieties with improved amylose content	2023-2024	4	Pak Sci Found-Nation Sci Found China (PSF-NSFC)	Ongoing/CoPI
6.	Identification and development of functional molecular markers related to resistance against viral diseases in chili	2021-2024	5	Pak. Sci. Foundation	Ongoing/CoPI
5.	Genome editing in wheat for improving yield, biotic and abiotic stress tolerance	2021-2024	10	PCST	Ongoing/Collab orator
4	Rapid development of high yielding drought tolerant lines of wheat through introgression of stable QTLs/Genes based on novel 90K iSELECT SNP assay	2018-2021	7.5	USPCAS-PARB	Completed/CoPI
3	Development of Protocol for long reads haplotyping in hexaploid wheat using PacBio Circular Consensus Sequencing	2019-2021	1.2	PSF-MSRT	Completed/PI
2	Biochemical and immunochemical prospects of modified wheat gluten in relation to gluten sensitive enteropathy.	2016-2017	0.5	Higher Education Commission (HEC)	Completed/CoPI
1	High resolution mapping for brown, yellow and black rust resistance genes in Pakistani wheat germplasm	2015-2016	0.5	HEC	Completed/PI

CONFERENCES

1. **Sajjad M**, D Liu, X Ma, W Yang, J Sun and A Zhang. Cloning and characterization of grain yield and heat tolerance related FLOURY ENDOSPERM 2 (Flo2) gene in common wheat (Triticum aestivum L.) Oral presentation. Tackling Climate Change through Plant Breeding. PMAS-UAAR. Nov13-15, 2017.
2. **Sajjad, M.** and S. H. Khan, 2014. Patterns of allelic diversity in spring wheat populations as revealed by SSRs. Oral presentation in 5th International Conference on Agriculture, Food Security and Climate Change. The University of Poonch Rawalakot. Sep.09-11, 2014.
3. **Sajjad, M**., and S. H. Khan. 2014. Pedigree and SSR data reveal dominant prevalence of few parents in pedigree of Pakistani wheat varieties. Oral presentation in 2nd National Conference on Advancement of Sciences and Research, COMSATS, Vehari, ASR-AGR-02.

COURSES TAUGHT

Undergaduate

- Introductory Genetics
- Introduction to Biosciences
- Introduction to Bioinformatics
- Natural Resource Management
- Environment and Development
- Environmental impact assessment

Postgraduate

- Advances in Biosciences Research
- Population Genetics
- Breeding Pulse Crops
- Breeding for Quality
- Cytogenetics for Crop Plants
- Molecular Plant Breeding
- Environmental Impact Assessment

STUDENTS SUPERVISED

PhD	Role	**Students' names** (registrations)	**Thesis Title**	**Status**
4.		Summan Aslam SP23-PBM-004	Development of Alpha-gliadin Free Wheat Line(s) in Pakistan	Enrolled

3.	Supervisor	Irum Khan (Fa18-Pbs-003)	Genome Wide Association Study for Pollen Grain Viability, Seed Setting and Grain Ionome in Wheat under Normal and Heat Stress Conditions	Enrolled
2.	Co-Supervisor	Sorour Arzhang	Genome and Transcriptome analysis of maize (*Zea mays* L.) under salt stress conditions	Completed
1.		Waseem Shah (CIITISP 18-PBS-003/ISB)	Large Scale Analysis of Polyadenylation Sites in Soybean	Enrolled
MS	Supervisor	Babar Ali CIIT/SP23/RBI/002	Rice-barley comparative genomics to expedite gene discovery in barley	Enrolled
16.		Irum Zahid CIIT/ FA22-RBI-001	Identification of genetic loci for tiller angle in pakistani historical varieties of wheat	Enrolled
`15.		Zain Mehmood CIIT/SP22-RBI-011	Genome-Wide Association Study for Floral Architecture in Pakistani Wheat Germplasm	Completed
14.		Arifa Zahir CIIT/SP22-RBI-001	Image-Based Phenotyping of Wheat Anther Length and Width Analysis	Completed
13.		Hamid Raza (CIIT/ SP17-RES-005/VHR)	Evaluation of Historical Wheat Cultivars for Adaptation to Integrated and Organic Fertilizers	Completed
12.		ANIQA AHMAD (MS170200653)	Validation of genetic molecular markers Underpinning key yield components in Pakistan Bread wheat (Triticum aestivum)	Completed
11.		Rao Raheel Hussain (CIIT/FA17-RES-015/VHR)	Identification of Genetic Traits Associated with Arsenic Accumulation in Wheat Genotypes	Completed
10.		Mariam Idrees (CIIT/SP19-RBM-074/ISB)	Genome Wide-Identification and Expression Analysis of ARID gene family in Wheat (*Triticum aestivum*)	Completed
9.		Saima Anwaar, (MS170401605)	Marker-trait Association for yield and heat tolerance traits in Pakistani wheat germplasm	Completed
8.		Lubna Mamoona (CIIT/FA19-RBS-012/ISB)	Genome-wide Identification of Alfin-like Transcription Factors in Bread Wheat (*Triticum aestivum* L.)	Completed
7.		Maria Sohail CUI/SP20-RBI-007/ISB	Genome-Wide Association Study for Grain Size in Pakistani Wheat Germplasm	Completed
		Hamid Raza (CIIT/ SP17-RES-005/VHR)	Evaluation of Historical Wheat Cultivars for Adaptation to Integrated and Organic Fertilizers	Completed
6.	Co-supervisor	Muhammad Zaheer (CIIT/FA18-RMG-013/ISB)	Genome-wide Identification and Expression Analysis of New Cobra-like Genes in Bread Wheat (Triticum aestivum)	Completed
5.		Ali Abdullah (CIIT/FA17-RES-011/VHR)	Interactive Effect of Genetic Variations and Silicon Application on Aphids Infestation and Nutritional Profile of Wheat (Triticum aestivum L.)	Completed
4.		Ayesha Farooq (51652004)	Karyotype analysis of hybrid of *Triticum aestivum* L. and *Hordeum vulgare* L. using fluorescence *in situ* hybridization	Completed
3.		Hamid Majeed (CIIT/FA17-RES-002/VHR)	Effect of urban heat island on socio-economic conditions of residents in Southern Punjab: A case study of Multan and Vehari	Completed
2.		Muhammad Mushtaq (CIIT/FA15-MES-008/VHR)	Genotypic and environmental Variation in the phenolic Antioxidant properties of Pakistani Wheat varieties	Completed
1.		Faisal Farooq (FA18-RMI-032)	Antibiotics, acid, and heat tolerance of essential oils adapted pathogenic microbes	Completed

PROFESSIONAL EXPERIENCE

Research

- CAS-PIFI Fellowship: Developing wheat and barley genetic resources and gene mining. Feb 2023- Aug 2024.
- CAS-PIFI Postdoctoral. Discovering yield and quality related genes in bread wheat. May, 2015-April 2017.
- IRSIP on genomics at Genomics and Gene Discovery Research Unit, USDA, Albany, California, USA. (August 2010-February 2011)
- Ph.D. research at Plant Breeding and Genetics, University of Agriculture,Faisalabad and Wheat Wide Crosses Lab, NARC. (Association mapping of yield traits in wheat (*Triticum aestivum* L.)
- M.Sc. Research at Ayub Agriculture Research Institute (AARI), Faisalabad. (Genetic diversity in sugarcane cultivars existing in Pakistan)
- Internship.B.Sc. (Hons.) research at Mutation Breeding Lab, Nuclear Institute for Agriculture and Biology (Plasmid isolation, PCR, gel electrophoresis and wheat physiological data recording using IRGA)

Teaching

- Teaching under-graduate and post-graduate courses from May 2019 to date
- Teaching various under-graduate and post-graduate courses from August 2014 to May 2019 in the Department of Environmental Sciences, COMSATS University.
- Teaching of under-graduate and post-graduate courses from 19th June 2013 to August 2014 in the Department of Plant Breeding and Genetics, PMAS-Arid Agriculture University Rawalpindi.

Trainings/Workshops

- Basic Wheat Improvement Course-2022 (BWIC2022). CIMMYT, Mexico; January 24th to May 31st, 2022.
- NIBGE-COMSTECH-ICGEB International Training Workshop on Use of Genome Editing and other New Breeding Technologies for Global Food Security, April 8-10, 2019.
- PINSTECH National Workshop on Analytical & Isotopic Tools for Hydrological & Environmental Studies, December 4-6, 2018.
- COMSTECH-PARC International Training Workshop on Plant Genetic Resources and Genebank Operations Management System, May 08 to 11, 2018.
- Genotyping by Sequencing overview and its application in crop improvement, NIBGE, 07th Feb 2013
- Six months training on genomics at Genomics and Gene Discovery Research Unit, USDA, Albany, California, USA.
- Intellectual property rights and innovation policy, COMSTECH, Islamabad, Pakistan, 6-10 June 2011.

Data analysis

Analysis and interpretations of data using softwares like R packages, Jamovi, XLSTAT, STATISTICA, MINITAB, SPSS, MSTATC, SRUCTURE and TASSEL, rTASSEL etc.

RESEARCH SKILLS

- QTL mapping approaches including linkage analysis (LA), association mapping (AM) and nested association mapping (NAM).
- Wheat hybridization and maintenance of various breeding populations
- Molecular biology techniques including cloning, plasmid and genomic DNA extractions, and numerous PCR applications.
- Development and application of unique repeat junction markers (RJM).
- Application of CRSPR Cas9 for genome editing in plants.
- Agronomy and plant genetics techniques including growing of plants in field, greenhouse and in sterile conditions, performing crossing, genetic analysis of phylogenies, application of statistical methods and marker-assisted selection.
- DNA and RNA and Protein sequence analysis using various analysis tools.

ACDAMIC AWARDS

- **CAS-PIFI** Visiting Scientist 2023, Chengdu Institute of Biology, Chinese Academy of Science.
- **TYSP** Talented Young Scientist (2019) Yunnan Academy of Agricultural Sciences (YAAS)
- **CAS-PIFI** Postdoctoral fellowship. Discovering yield and quality related genes in bread wheat. May, 2015-April 2017.
- **CRPA** COMSATS Research Productivity Award 2014-2023.
- **HEC** Ph.D-Indigenous scholarship from HEC, 2007-2012
- **IRSIP** International Research Support Initiative Program (IRSIP) from HEC, Aug 2010-Feb 2011

- **UMS** University Merit Scholarship for B.Sc (Hons), 2002-2005
- **USAID** Scholarship for M.Sc (Hons), 2005-2007

RESEARCH ACHIEVEMENTS

- Developed a new and simple method of preserving wheat pollen grains for longer time period.
- Submission of blast resistant and early maturing rice variety in VEC
- Developed RILs populations for QTL mapping of yield and drought stress.
- Identified more than 35 new yield related genes in bread wheat.
- Developed new InDel8 marker of marker assisted selection for TGW in hexaploid wheat.
- Developed a simple and cost-efficient protocol for mass scale gene cloning in hundreds of wheat accessions simultaneously.

PROFESSIONAL ACTIVITIES

- Member of The American Association for the Advancement of Science (AAAS)
- Member of National Academy of Young Scientists (NAYS)
- President Society of Plant Breeders and Geneticists (Aug 2009-Sep 2010)
- International Society for Development and Sustainability (ISDS)
  Membership ID: M1500610

COMMUNITY SERVICE

International

- **Guest Associate Editor:** Frontiers in Genetics
- **Review Editor** for Plant Genomics, Frontiers in Genetics
- **Review Editor** for Plant Breeding, Frontiers in Plant Science
- **Guest Associate Editor:** Genes MDPI
- **Trainer**: Catered training to graduate students and faculty for developing SMRT sequencing libraries at Urmia University, Iran. (15-22 Feb 2020).
- Patent submitted in Beijing (2017)

Institutional

- Batch Counselor (Spring 2021, Fall 2022, Fall 2023).
- Member Undergraduate Programs Committee (Spring 2021).
  At Vehari Campus
- Member of Research farm committee (Fall 2014)
- Vehari Campus Cricket Convener (Spring 2015)
- Departmental Convener Cricket (May 2017 -December 2018)
- Departmental Convener of committee (January 2019- May 2019)
- Member of performance evaluation committee (FA18-SP19)
- Member of Campus Proctorial committee (January 2019- May 2019)
- Member wheat Sale committee CUI, Vehari (May 2018-May 2019)
- Batch advisor BS Environmental Sciences-Fall 2018
- Member Printing and Press committee International Conference -ESCON2019
- Prepared press releases in Urdu and English about ESCON 2019

Peer Reviews

Thesis Evaluations

- Bahauddin Zakariya University
  - -3 MS theses evaluated.
- University of Agriculture Faisalabad
  - -3 MS theses evaluated.
- University of the Punjab
  - -12 MS theses evaluated.

Journals Peer Reviews

- Peer reviews for the following SCI journals.
  - Plants
  - Genes
  - Frontiers in Plant Science
  - Agronomy-MDPI
  - Frontiers in Genetics
  - Molecular Biology Reports
  - BMC Plant Biology
  - International Journal of Agriculture and Biology
  - Pakistan Journal of Agricultural Sciences
  - Egyptian Journal of Agronomy
  - Horticulture-MDPI.
