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Education and Work experience

- 2017- Present Industrial Postdoc, quantitative and computational genomics**
Nordic Seed and Faculty of Science and Technology, Aarhus University, Denmark
Project: Genome wide association mapping, genomics prediction and transcriptomic to improve hybrid rye against pathogens cause Fusarium head blight and ergot
Task: Integration of phenotypic and genetic resources of resistance into elite rye germplasm of breeding program of Nordic Seed A/S
- 2014- 2017 Postdoc, NGS application in weed genomics**
Faculty of Science and Technology, Aarhus University, Denmark
Project: Deciphering micro-evolution of herbicide resistance using next generation sequencing technology in grass weeds
- 2010 – 2014 PhD, Molecular and Transport Biology**
Department of Plant and Environmental Sciences
University of Copenhagen, Denmark
Thesis title: Genomic approaches towards identification of components involved in peptide based cell growth of *Arabidopsis thaliana*
- 2006 – 2009 M.Sc. Molecular Ecology**
South China Agriculture University
Guangzhou, China
Thesis title: Induction of rice allelopathy through various biotic and abiotic stresses.
- 2001 – 2005 B.Sc. Agricultural Science**
Bahauddin Zakariya University, Multan, Pakistan

Awards:

- **Project Funded by ERA-NET (European research network)**
- **Industrial Postdoc** funded by Innovation Fund Denmark and Nordic seed A/S
- **Postdoc Fellowship** Funded by Danish ministry of science and technology
- **Postdoc** funded by **Danish strategic research council**
- **PhD Fellowship** Funded by **Danish Science Foundation**
- **MSc Fellowship** Funded By **Chinese Scholarship Council and Government of Pakistan**
- Merit scholarship during **B.Sc.** education

List of Publications:

Publication on track

1. **Khalid Mahmood**, Marielle Babineau, Solvejg K. Mathiassen, Per Kudsk and Michael Kristensen (2018) De novo sequencing, transcriptomic diversity and identification of genes in leaves of herbicide resistant biotypes of grassy weed *apera spica-venti*. *Molecular Ecology* (in progress)
2. Marielle Babineau, **Khalid Mahmood**, Solvejg Mathiassen, Per Kudsk and Michael Kristensen (2018), Differential Expression of Genes Involved in Metabolic Resistance to an Acetolactate Synthase Inhibitor Herbicide in the Weed *Apera spica-venti*. *The Plant Genome* (Submitted)
3. Khalid Mahmood, Sisse K. Gjetting, , Kasper Kildegaard Sørensen, Astrid Kristensen Knud Jensen, Michael G. Palmgren, Kirsten Jørgensen, Anja T. Fuglsang (2018) ” RALF peptides function as a brake for PSY1 induced cell elongation by modulating activity of PM H⁺-ATPase” *The Plant Cell* (Submitted)

Published article (Total IF=44.891)

1. Idin Zibae, **Khalid Mahmood**, Ali Reza Bandani, Qodratollah Sabahi, Michael Kristensen (2017). The molecular mechanisms of organophosphate resistance in tomato leaf miner moth *Tuta absoluta* (Lepidoptera: Gelechiidae) from Iran. *Journal of applied entomology*, 142: 181–191 IF=1.641

2. Marielle Babineau, **Khalid Mahmood**, Solvejg Mathiassen, Per Kudsk and Michael Kristensen (2017) De novo transcriptome assembly analysis of weed *Apera spica-venti* from seven tissues and growth stages. *BMC Genomics*, 18:128, DOI: 10.1186/s12864-017-3538-4. IF=3.867
3. Khawar Jabran, **Khalid Mahmood**, Ali Hassan Bajwa, Per Kudsk (2017). Weed dynamics in winter wheat: A review article. *Advances of Agronomy* (Accepted). IF= 5.843
4. Muhammad Shahid, Muhammad Ijaz, Muhammad Tahir, **Khalid Mahmood** (2017) Potential plant growth-promoting strain *Bacillus* sp. SR-2-1/1 decolorized azo dyes through NADH-ubiquinone oxidoreductase activity. *Bioresource Technology* (accepted). IF= 5.651
5. **Khalid Mahmood**, Solvejg Kopp Mathiasen, Michael Kristensen, Per Kudsk (2016) Multiple Herbicide Resistance in *Lolium multiflorum* and Identification of Conserved Regulatory Elements of Herbicide Resistance Genes. *Frontiers in Plant Science* 7: 1160 doi: 10.3389/fpls.2016.01160: IF= 4.495
6. **Khalid Mahmood**, Dorte Heidi Højland, Torben Asp and Michael Kristensen (2016) Transcriptome analysis of an insecticide resistant housefly strain: insights about SNPs and regulatory elements in cytochrome P450 genes. *Plos One* 11(3): e0151434. doi:10.1371/journal.pone.0151434. IF=3.057
7. Marlen Landschreiber, **Khalid Mahmood**, Alexander Schulz, Anja Thoe Fuglsang (2015). What is the role of FAB1C in PSY1 mediated cell growth? *FEBS journal*, 47. IF=4.327
8. **Khalid Mahmood**, Rubini Kannangara, Kirsten Jørgensen, Anja T. Fuglsang (2014). “Analysis of peptide PSY1 responding transcripts in the two *Arabidopsis* plant lines: wild type and psy1r receptor mutant”. *BMC Genomics* 15: 441. IF=3.867
9. Anja T. Fuglsang, Jörgen Persson, Tracey A. Cuin, Kristina H. Thuesen, Waltraud X. Schulze, Astrid Kristensen, Cecilie K. Ytting, Christian B. Oehlenschläger, **Khalid Mahmood**, Teis E. Sondergaard, Yoshikatsu Matsubayashi, Sergei Shabala2, Michael G. Palmgren (2014). Receptor kinase mediated control of primary active proton pumping at the plasma membrane. *The Plant Journal* 80(6): 951-964. IF= 5.901
10. Muhammad Ijaz, **Khalid Mahmood**, Bernd Honermeier (2015). Interactive Role of Fungicides and Plant Growth Regulator (Trinexapac) on Seed Yield and Oil Quality of Winter Rapeseed. *Agronomy* 5(3), 435-446. IF=1.78
11. **Khalid Mahmood**, MB. Khan, M.Ijaz, R.S Zeng and SM Luo (2014). Molecular, Biochemical and Bioassay based evidence of lower allelopathic potential in genetically modified rice. *Plant Growth Regulation* 74: 73-82. IF=2.333
12. **Khalid Mahmood**, MB Khan, YY Song, M Ijaz, SM Luo, RS Zeng (2013) “UV-irradiation enhances rice allelopathic potential in rhizosphere soil.” *Plant Growth Regulation*, 71: 21-29. IF=2.333
13. **Khalid Mahmood**, M. B. Khan, Y. Y. Song, Mao Ye, S. R. Baerson and R. S. Zeng (2013) “Differential morphological, cytological and biochemical responses of two rice cultivars to coumarin”. *Allelopathy Journal*. 281-296. IF= 1.050
14. **Khalid Mahmood**, MB. Khan, M.Ijaz, R.S Zeng and SM Luo (2013). Exogenous applications of signaling compounds induce rice allelopathic potential in rhizosphere soil. *International Journal of Agriculture and Biology*, 15(6), 1319-1324. IF=0.758
15. M.B. Khan, M.A Gurchani, M. Hussain, S. Fareed and **Khalid Mahmood** (2011) "Wheat seed enhancement by Vitamin and Hormonal Priming. *Pakistan Journal of Botany*, 43: 1495-1499. IF=0.658
16. M.B. Khan, M.A Gurchani, M. Hussain and **Khalid Mahmood** (2010) Wheat seed invigoration by pre-sowing chilling treatments. *Pakistan Journal of Botany*, 42: 1561-1566. IF=0.658
17. **Khalid Mahmood**, Muhammad Bismillah Khan, Mubshar Hussain, Madiha Aman Gorchani (2009). Weed management in wheat through allelopathic crop water extracts. *International Journal of Agriculture and Biology* 11: 751-755. IF=0.758

Conference Abstracts

1. **Khalid Mahmood**, Solvejg Mathiassen and Per Kudsk (2017) “**Hunt for regulatory elements responsible for the micro-evolution of herbicide resistance**” NORBARAG meeting, Vilnius, Lithuania
2. **Khalid Mahmood**, Solvejg Mathiassen and Per Kudsk (2016) Mining the transcriptional regulation of multiple herbicide resistance in *Lolium multiflorum*, NORBARAG meeting, Helsinki, Finland.
3. **Khalid Mahmood**, Solvejg Mathiassen and Per Kudsk (2015) Monitoring of Italian ryegrass (*Lolium multiflorum*) biotypes for herbicidal resistance in Denmark and analysis of fitness cost at various pH. *Resistance 2015*, Rothamsted Research Centre, United Kingdom
4. Marielle Babineau, **Khalid Mahmood**, Solvejg Mathiassen, Per Kudsk and Michael Kristensen (2015). De novo assembly of *Apera spica-venti* to decipher herbicide resistance. *Resistance 2015*,

Rothamsted Research Centre, United Kingdom

5. Sisse K. Gjetting, **Khalid Mahmood**, Anja T. Fuglsang (2015) “In vivo calcium signaling induced by secreted RALF peptide hormones” Plant Biotech Denmark, Annual meeting
6. **Khalid Mahmood**, Sisse K. Gjetting, Astrid Kristensen, Michael G. Palmgren, Kirsten Jørgensen, Anja T. Fuglsang (2013). RALF peptide function as a brake for PSY1 induced cell elongation by modulating activity of PM H⁺-ATPase. Scandinavian Plant Physiology Society (SPPS) held in Helsingør, Denmark
7. **Khalid Mahmood**, Sisse K. Gjetting, Astrid Kristensen, Michael G. Palmgren, Kirsten Jørgensen, Anja T. Fuglsang (2013) “Two Secreted Peptides Regulate Plant Proton Pump during Cell Elongation” Plant Biotech Denmark, Annual meeting
8. Sisse K. Gjetting, Cecile K. Ytting, **Khalid Mahmood**, Alexander Schulz and Anja T. Fuglsang (2013). Using genetically encoded biosensors to study plant cell signaling. Plant Biotech Denmark, Annual meeting.
9. **Khalid Mahmood**, Sisse K. Gjetting, Astrid Kristensen, Michael G. Palmgren, Kirsten Jørgensen, Anja T. Fuglsang (2012) “Two Secreted Peptides Regulate Plant Proton Pump during Cell Elongation” Genomic Approaches to Plant Signaling Systems, Gordon Research Conference. USA.
10. **Khalid Mahmood**, Astrid Kristensen, Michael G. Palmgren, Kirsten Jørgensen, Anja T. Fuglsang (2011) “Identification of components involved in peptide based stimulation of cell elongation” Annual meeting at Center for Membrane Pumps in Cell and Diseases (PUMPKin)
11. **Khalid Mahmood**, Astrid Kristensen, Michael G. Palmgren, Kirsten Jørgensen, Anja T. Fuglsang (2010) “Mechanism Behind Peptide stimulation of cell elongation” Scandinavian Plant Physiology Society (SPPS) held in Helsinki, Finland.
12. Khalid Mahmood (2008) “*UV-irradiation exposure promotes rice root exudation in rice rhizosphere Soil*” Abstract presented at 5th world international conference on Allelopathy held in New York, USA at September 2008.
13. Khalid Mahmood (2009) “*Risk assessment of genetically modified crop on human health*. Abstract presented in Chinese ecological society held in Guangzhou at November 2009
14. Three Abstracts accepted in 2nd Asian Allelopathy Conference that held in Guangzhou, China at December 2009.

Reviewer:

I have reviewed manuscripts (>35) for several journals such as a) Plant Growth Regulation b) Frontiers in Plant science c) Nature Scientific Reports d) Molecules e) Biochemical and Systematics Ecology f) Journal of Cereal Science g) Crop and Pasture Science h) Scientia horticulturae i) Microarray j) Pakistan Journal of botany k) Pakistan Journal of zoology l) Rice *etc*

<https://publons.com/author/589748/khalid-mahmood#profile>

Project Titles

- Rye Germplasm Characterization and deployment in breeding strategy of Nordic Seed A/S
- Integration of phenotypic, genetic and pedigree information of Rye germplasm
- Deciphering microevolution of ALS and metabolic based herbicide resistance in *Apera spica venti* using RNAseq
- Monitoring of Italian ryegrass (*Lolium multiflorum*) biotypes for herbicidal resistance in Denmark
- Transcriptome analysis of insecticide resistance in *Musca domestica*
- Gene expression profiling, Transcriptome and Bioinformatic analysis of peptide-treated *Arabidopsis* plant lines
- Molecular mechanism behind peptide based stimulation of cell elongation
- Role of ligand and receptor in plant growth and development
- Role of secondary metabolites in resistance to insects and fungal diseases
- Effect of environmental stresses on secondary metabolites production in different plant species
- Role of Plant signaling compounds (JA, SA, Ethylene etc) in response to abiotic and biotic stresses
- Use of molecular and biochemical tools in plant tolerance through priming

Technical Skills

- Next Generation sequencing (NGS)
- Genotyping by Sequencing
- Molecular Assisted Breeding

- Gene ontology, Transcriptome data analysis of non-model organisms,
- R, Perl and Python for NGS analysis
- Phylogenomics, Bioinformatic tools and Phylogenetic analysis
- Genetic screening of mutant *Arabidopsis thaliana* plant lines
- Transformation, cloning and western blotting
- Microarray data analysis
- Isolation of plasma membrane proteins and proton pumping assay
- Metabolomics
- Screening and generation of mutant plant lines
- Standard molecular techniques
- RNAi interference
- Recombinant DNA techniques
- Specimen preparation for transmission, confocal and scanning electron microscope
- Image analysis
- Spectrophotometry (Mass Spectroscopy, Atomic Absorption Spectroscopy, NMR)
- Chromatography (HPLC, GC, TLC)
- Metabolite profiling and gene expression analysis
- Enzyme analysis through spectrophotometer

References:

- 1- **Michael Kristensen, PhD (Postdoc guide)**
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- 3- **Anja Thoe Fuglsang, PhD (Supervisor, PhD thesis)**
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- 5- **Luo Shiming, PhD (Supervisor, Master thesis)**
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