Curriculum Vitae

Name:	Dr. Karanjeet Singh Sandhu
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Key Achievements:

- ✓ Trained junior scientists and higher degree students in rust genetics and pathology.
- ✓ Mapped new major gene *Rph21* for barley leaf rust resistance.
- ✓ Developed microsatellite markers for myrtle rust causing pathogen *Austropuccinia psidii*.
- ✓ Successfully established myrtle rust testing facility at the Plant Breeding Institute Cobbitty.
- ✓ Identified stem rust resistance gene *Sr2* in triticales.
- ✓ Developed integrated disease management package to reduce the impact of wheat stripe rust in the northern region.
- ✓ Published posters and fact sheets on the integrated disease management of rust diseases.
- ✓ Trained agronomists and farmers in the management of foliar diseases of wheat and provided disease diagnostic and advisory services.
- ✓ Phenotyped wheat, oat, barley, triticale and myrtaceous germplasm for rust resistance.
- ✓ Developed computer-based rust collection database at the Plant Breeding Institute Cobbitty.
- ✓ Worked as IT Support volunteer during Sydney Olympics 2000.

Employment History:

Sep. 2012 to Date	**Wheat Rust Pathologist** **Postdoctoral Research Associate – Academic Operations** The University of Sydney Plant Breeding Institute, Cobbitty NSW 2570
Current project:	
2023 to 2026	Currently, coordinating the GRDC funded research project (UOS2301-004RTX) "Optimising genetic control of wheat rusts through improved phenotyping".
Previous projects:	Successfully coordinated the following research projects:
2017 to 2022	ACIAR funded project "Mitigating the effects of stripe rust on wheat production in south Asia and eastern Africa" including collaborations with the scientists from Ethiopia, India, Nepal and Pakistan.
2015 to 2016	GRDC funded project "Adult Plant Resistance and strategic fungicide use for integrated management of cereal rust, *Septoria nodorum* blotch and yellow leaf spot in wheat".
2013 to 2015	GRDC funded project "Interaction of Adult plant resistance and strategic fungicide use for wheat stripe rust management".
2012 to 2013	Plant Health Australia funded project "Genetic basis of pathogenicity in *Uredo rangelii*".
2011 to 2012	**Plant Pathologist - Wheat** Department of Agriculture, Fisheries and Forestry Leslie Research Centre, Toowoomba QLD 4350
2001 to 2011	**Research Assistant** The University of Sydney Plant Breeding Institute, Cobbitty NSW 2570

1995 to 1998	**Assistant Professor (Plant Protection)** Regional Research Station, Bathinda Punjab Agricultural University, Ludhiana, India
1994 to 1995	**Technical Officer (Plant Protection)** Crop Protection Division, Hindustan Ciba Geigy Ltd. India

Academic Qualifications:

2011	**PhD Plant Breeding & Genetics** The University of Sydney NSW, Australia
Research Project:	"Genetic and Molecular Analyses of Barley for Seedling and Adult Plant Resistance against Rust Diseases"
1994	**MSc Entomology & Plant Pathology** Punjab Agricultural University, Ludhiana, India *Recognised by NOOSR, Australia
Research Project:	"Bioactivity of *Melia azedarach* L. against diamondback moth *Plutella xylostella* (L.)"
1990	**BSc Agriculture (Hons.)** GNDU Amritsar, India *Recognised by NOOSR Australia

Additional Qualifications:

2012	**Constructive Team Leadership Course** Industry Services, DPI Queensland Department of Employment, Economic Development and Innovation
2010	**Radiation Safety for Laboratory Workers** The University of Sydney NSW, Australia
Valid till 2022	**Chemical Accreditation AQF-3** ChemCert Training Group Pty Ltd St Leonards NSW, Australia
2001	**Certificate IV in Information Technology** **SA-IT-Using, Managing and Implementing Linux** TAFE, NSW, Australia
2000	**Certificate IV in Information Technology** **Certificate III in Information Technology** TAFE, NSW, Australia

Supervision of students

Currently associating in the supervision of two PhD students working on myrtle rust projects. Previously, guided one PhD student from the University of Agriculture Peshawar, Pakistan, one PhD student from the Australian National University, two PhD students from the University of Melbourne and one MSc student from the Macquarie University, and they completed at least one of their MSc/PhD chapters under my guidance.

Awards: PAU merit scholarship in MSc and GRDC scholarship in PhD

LIST OF PUBLICATIONS

Refereed Journals:

Singh, D.; Kankwatsa, P.; **Sandhu, K.S.**; Bansal, U.K.; Forrest, K.L.; Park, R.F. (2024) Mapping of Leaf Rust Resistance Loci in Two Kenyan Wheats and Development of Linked Markers. Genes 2024, 15, 583. https://doi.org/10.3390/genes15050583

Sandhu KS, Singh D, Belayineh FY, Negash T, Khan H, Bhardwaj SC, Baidya S, Thapa DB, Fayyaz M, Asad S, Randhawa MS, Park RF (2024) Identification of synthetic wheat lines with broadly effective stripe rust resistance. *Australasian Plant Pathology https://doi.org/10.1007/s13313-024-00971-x*

Sandhu KS, Singh, D & Park RF (2021) A pictorial disease assessment scale for assessing wheat stripe rust at adult plant growth stage. *Australasian Plant Pathology* https://doi.org/10.1007/s13313-021-00827-8

Khan SN, Hassan G, Khan MR, Facho ZH, Singh D, **Sandhu KS**, Sanaullah M, Imtiaz M and Ali S (2021) Field assessment and molecular markers-based characterization of yellow rust resistance in wheat hybrid progenies. *The journal of animal and plant sciences* **32**(1), Doi.org/10.36899/JAPS.2022.1.0409

Yong WTL, Ades PK, Runa FA, Bossinger G, **Sandhu KS**, Potts BM, Tibbits JFG (2021) Genome-wide association study of myrtle rust (*Austropuccinia psidii*) resistance in *Eucalyptus obliqua* (subgenus *Eucalyptus*). *Tree Genetics & Genomes* **17**:31, Doi.org/10.1007/s11295-021-01511-0

Tobis PA, Schwessinger B, Deng CH, Wu C, Dong C, Sperschneider J, Jones A, Lou Z, Zhang P, **Sandhu K**, Smith GR, Tibbits J, Chagné D, Robert P (2021) *Austropuccinia psidii*, causing myrtle rust, has a gigabase-sized genome shaped by transposable elements. *G3*: *Genes*|*Genomes*|*Genetics* **11**(3), Doi.org/10.1093/g3journal/jkaa015

Berthon KA, Winzer LF, **Sandhu K**, Cuddy W, Manea A, Carnegie AJ, Leishman MR (2019) Endangered species face an extra threat: susceptibility to the invasive pathogen *Austropuccinia psidii* (myrtle rust) in Australia. *Australasian Plant Pathology* **48**: 385–393, Doi.org/10.1007/s13313-019-00640-4

Yong WTL, Ades PK, Goodger JQD, Bossinger G, Runa FA, **Sandhu KS**, Tibbits JFG (2019) Using essential oil composition to discriminate between myrtle rust phenotypes in *Eucalyptus globulus* and *Eucalyptus obliqua*. *Industrial Crops & Products* **140**: 111595, Doi.org/10.1016/j.indcrop.2019.111595

Yong WTL, Ades PK, Bossinger G, Runa FA, **Sandhu KS**, Potts BM, Tibbits JFG (2019) Geographical patterns of variation in susceptibility of *Eucalyptus globulus* and *Eucalyptus obliqua* to myrtle rust. *Tree Genetics & Genomes* **15**: 31 Doi.org/10.1007/s11295-019-1338-5

Yong WTL, Ades PK, Tibbits JFG, Bossinger G, Runa FA, **Sandhu KS** and Taylor PWJ (2019) Disease cycle of *Austropuccinia psidii* on *Eucalyptus globulus* and *Eucalyptus obliqua* leaves of different rust response phenotypes. *Plant Pathology* **68:** 547–556, Doi.org/10.1111/ppa.12959

Hsieh JF, Chuah A, Patel H, **Sandhu KS**, Foley W and Külheim C (2018) Transcriptome profiling of *Melaleuca quinquenervia* challenged by myrtle rust reveals differences in defense responses among resistant individuals. *Phytopathology* **108** (4): 495–509, Doi.org/10.1094/PHYTO-09-17-0307-R

Sandhu KS, Karaoglu H, Park RF (2016) Pathogenic and genetic diversity in *Puccinia hordei* Otth in Australasia. *Journal of Plant Breeding and Crop Science* **8** (10): 197–205, DOI: 10.5897/JPBCS2016.0582

Sandhu KS, Singh D, Park RF (2016) Characterisation of leaf rust resistance in international barley nurseries. *Journal of Plant Breeding and Crop Science* **8** (8): 117–125, DOI: 10.5897/JPBCS2016.0587

Potts BM, **Sandhu KS**, Wardlaw T, Freeman J, Li H, Tilyard P, Park RF (2016) Evolutionary history shapes the susceptibility of an island tree flora to an exotic pathogen. *Forest Ecology and Management* **368**: 183–193, DOI: 10.1016/j.foreco.2016.02.027

Sandhu KS, Karaoglu H, Zhang P, Park RF (2016) Simple sequence repeat markers support the presence of a single genotype of *Puccinia psidii* in Australia. *Plant Pathology* **65**: 1084–1094, Doi.org/10.1111/ppa.12501

Park RF, Golegaonkar PG, Derevnina L, **Sandhu KS**, Karaoglu H, Elmansour HM, Dracatos PM and Singh D (2015) Leaf Rust of Cultivated Barley: Pathology and Control. *Annual Review of Phytopathology* **53**: 26.1–26.25, DOI: 10.1146/annurev-phyto-080614-120324

Sandhu KS, Singh D, Park RF (2014) Characterising seedling and adult plant resistance to *Puccinia hordei* in *Hordeum vulgare*. *Annals of Applied Biology* **165**: 117–129, Doi.org/10.1111/aab.12122

Sandhu KS, Forrest KL, Kong S, Bansal UK, Singh D, Hayden MJ, Park RF (2012) Inheritance and molecular mapping of a gene conferring seedling resistance against *Puccinia hordei* in the barley cultivar Ricardo. *Theoretical and Applied Genetics* **125**: 1403–1411, DOI: 10.1007/s00122-012-1921-8

Dilawari VK, **Singh Karanjeet** and Dhaliwal GS (1994) Effects of *Melia azedarach* L. on oviposition and feeding of *Plutella xylostella* (L.). *Insect Science and Application* **15** (2): 203–205, DOI: https://doi.org/10.1017/S1742758400015460

Dilawari VK, **Singh Karanjeet** and Dhaliwal GS (1994) Sensitivity of diamondback moth *Plutella xylostella* (L.) to *Melia azedarach* L. *Pesticide Research Journal* **6** (1): 71–74, URL: https://www.indianjournals.com/ijor.aspx?target=ijor:prj&volume=6&issue=1&article=010

Conferences, workshops, and project reports:

Sandhu KS, Singh, D & Park RF (2024) Novel methods of high throughput year-round multi-pathotype phenotyping for adult plant resistance to rust diseases of wheat. Proceedings 3rd *International Wheat Congress*, 22–27 Sep. 2024, Perth WA, Australia pp. 195

Sandhu KS, Singh D and Park RF (2019) Synthetic hexaploid wheats with stripe rust resistance. *1st International Wheat Congress*, 22–26 Jul. 2019, Saskatoon, Saskatchewan, Canada. pp. 101

Sandhu KS, Singh D, Hundie B, Derso E, Singh GP, Chatrath R, Bhardwaj S, Mahto B, Thapa D, Munir A, Rattu A, Huttner E and Park RF (2018) Mitigating the effects of stripe rust on wheat production in South Asia and Eastern Africa. *15th International Cereal Rust and Powdery Mildew Conference*, 23–26 Sep. 2018, Kruger National Park, Skukuza, South Africa. pp. 43

Sandhu KS and Park RF (2017) Effect of climate on the expression of adult plant stripe rust resistance genes in wheat. International Wheat Genetics Symposium (IWGS), 23–28 Apr. 2017, Austria. pp. 271

Winzer LF, Berthon KA, **Sandhu KS**, Leishman MR (2017) Dominant Australian native vegetation communities in danger. Science Protecting Plant Health Conference 2017, 26–28 Sep. 2017, Brisbane Convention Centre, Queensland, Australia. pp. 64

Sandhu KS and Park RF (2015) Expression of adult plant stripe rust resistance in selected Australian wheat genotypes. The Borlaug Global Rust Initiative (BGRI) technical workshop, 17–20 Sep. 2015, Sydney, Australia

Sandhu KS and Park RF (2015) Genetic diversity in *Puccinia psidii* and its pathogenicity to native myrtaceae in Australia. Conference "Botany 2015, Science and Plants for People" 25–29 Jul. 2015, the Shaw Conference Centre Edmonton, Alberta, Canada. pp. 8

Park, RF, Golegaonkar P, Derevnina L, **Sandhu K**, Elmansour H, Dracatos P, Singh D (2014) Adult plant resistance to leaf rust in barley: the story so far. In: 1st International Workshop on Barley Leaf Diseases, Salsomaggiore Terme, Italy, 3–6 Jun. 2014. pp. 47

Park, RF, Derevnina L, Dracatos P, Elmansour H, Golegaonkar P, **Sandhu K**, Wellings C and Singh D (2014) Understanding durable rust resistance in barley. In: BGRI 2014 Technical Workshop (22–25 Mar.) Obregon, Mexico. pp. 31

Sandhu KS, Park RF (2013) Genetic basis of pathogenicity in *Uredo rangelii*, Final Report, National Myrtle Rust Transition to Management (T2M) Program, Plant Health Australia, http://myrtlerust.net.au/wordpress/wp–content/uploads/2014/07/Genetic–basis–of–pathogenicity–in–Uredo–rangelii.pdf

Sandhu K, Park R, Singh D (2012) Characterisation of barley leaf rust resistance in four international nurseries, in: W. Q. Chen (Ed.), *13th International Cereal Rust and Powdery Mildew Conference*, 28 Aug.–1 Sep. 2012, China Agricultural Science and Technology Press, Beijing, China. pp. 113

Sandhu KS (2012) Preparing for stripe rust management. Research update 2012, Department of employment, economic development and innovation. Leslie Research Centre, Toowoomba, Queensland, Australia. https://grdc.com.au/uploads/documents/DEEDI-Rust-Update-2012.pdf

Sandhu KS, Reinheimer J, Park RF, Bansal UK, Khatkar D, Bariana HS (2009) Stem rust resistance gene *Sr2* identified in triticale using linked morphological and molecular markers. *14th Australasian Plant Breeding Conference and 11th SABRAO Congress*, Cairns Australia, Special edition *SABRAO Journal of Breeding and Genetics* **41**

Dilawari VK, **Singh Karanjeet** and Dhaliwal GS (1995) Toxic and Bioregulatory Properties of Different Fractions of *Melia azedarach* L. against *Plutella xylostella* (L.). International Conference '*Sustainable Agriculture and Environment*' Jan. 11–13 1995, Hissar, India, pp. 46

Dilawari VK, **Singh Karanjeet** and Dhaliwal GS (1992) Bioactivity in the drupes of *Melia azedarach* L. against insect pests. *National Symposium on Recent Advances in Integrated Pest Management*, Oct. 12–15, PAU, Ludhiana, India, pp. 158

Sequences submitted with NCBI:

Sandhu KS, Karaoglu H, Zhang P, Park RF (2015) *Puccinia psidii* isolate Aus_3, Whole Genome Shotgun sequencing project: GenBank: LKHF00000000.1
URL: https://www.ncbi.nlm.nih.gov/nuccore/LKHF00000000

Dissertations:

PhD Thesis (2011) Genetic and Molecular Analyses of Barley for Seedling and Adult Plant Resistance against Rust Diseases. The University of Sydney, NSW, Australia
URL: https://ses.library.usyd.edu.au/handle/2123/8860

MSc Thesis (1994) Bioactivity of *Melia azedarach* L. against diamondback moth *Plutella xylostella* (L.). Punjab Agricultural University, Punjab, India
URL: https://krishikosh.egranth.ac.in/handle/1/5810138259