South Dakota State University, Department of Agronomy, Horticulture and Plant Science

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**Professional Preparation.**

**College/University Location Major Degree &Year**

CSS Haryana Agricultural University Hisar, India Agriculture (Hons.) B.S. 1999

Punjab Agricultural University Ludhiana, India Plant Breeding &Genetics M.S. 2001

Punjab Agricultural University Ludhiana, India Plant Breeding Ph.D. 2005

**Appointments/Professional Experience**

* Assistant Professor (Winter wheat Breeder), South Dakota State University, Brookings, SD from October 2014 - present
* Senior Scientist, Kansas State University, Manhattan, KS from Jul 2013 - Sep 2014
* Research Associate, Kansas State University, Manhattan, KS from Nov 2006 - Jun2013
* Visiting Scientist, Kansas State University, Manhattan, KS from Nov 2005 - Oct 2006

**Honors and Awards**

* **K-State Make a Difference Award 2010** by Women for Engineering and Science Kansas State University, Manhattan, KS.
* **MS Randhawa Medal** (2003) for best essay on ‘Evolution of life” **Title: “Second Green Revolution”** given by Punjab Agricultural University, Ludhiana, India.
* **University Merit Fellowship** during Ph.D. (2002-2005).

**Teaching Experience**

* **PS787 -Advanced Plant Breeding** (Spring 2015 and Spring 2017)
* **BIOS 664/BIOS792 -Molecular Plant Physiology** (Team taught, Spring 2015 and Spring 2017**)**
* **PLPTH 915 Chromosome/Genome Analysis”** (Guest lectures Fall 2011 and Fall 2013) at Kansas State University

**Professional Activities (e.g., memberships, service, public outreach, diversity activities)**

* Member – Agronomy Society of America and Crop Science Society of America
* Member – American Association for the Advancement of Science
* Coordinating committee member International Wheat Genome Sequencing Consortium (IWGSC) (2009-2014)
* Executive member of USWBSI-HWW-CP (2017 onwards)

**Grants Received as PI**

**Current Grants**

1. Developing high yielding winter wheat varieties with excellent end-use quality for South Dakota funded by South Dakota Wheat Commission from 2017 to 2018 (105,000 USD)
2. Accelerated breeding for disease and insect pest resistance in winter wheat funded by South Dakota Wheat Commission from 2017 to 2018 (30,000 USD)
3. Winter Wheat Breeding for Scab Resistance in South Dakota funded by USDA-USWBSI from 2016 to 2018 (103,200 USD)
4. WheatCAP: Validation, characterization, and deployment of QTL for grain yield components in wheat (lead institute UCD) funded by USDA-NIFA from 2016 to 2021 (432,541 USD)
5. Breeding for rust resistance NACA agreement funded by USDA as a multi-year extramural non assistance cooperative agreement 2015 to 2018 (72,295 USD)

**Publications – Refereed Journal Articles**

1. Wiersma, AT, Whetten RB, Zhang G, Sehgal SK, Kolb FL, Poland JA, Mason RE,Carter AH, Cowger C, and Olson EL (2018). Registration of Two Wheat Germplasm Lines Fixed for *Pm58*. *J. Plant. Reg*. 0. doi:10.3198/jpr2017.06.0036crg
2. Abdullah S, **Sehgal SK**, Glover K, Ali S (2017) Reaction of Global Collection of Rye (*Secale cereale L*.) to Tan Spot and *Pyrenophora tritici-repentis* Races in South Dakota. *The Plant Pathology Journal* **33**: 229-237.
3. Abdullah S, **Sehgal SK** and Ali S (2017) Race diversity of *Pyrenophora tritici-repentis* in South Dakota and response of predominant wheat cultivars to Tan Spot. *J Plant Pathol Microbiol* **8**: 409.
4. Abdullah S, **Sehgal SK\***, Yu J, Turnipseed B, Ali S\* (2017) Insight into tan spot and stem rust resistance and susceptibility by studying the pre-green revolution global collection of wheat. *The Plant Pathology Journal* **33**:125-132.
5. Abdullah S, **Sehgal SK**, Ali S, Laiiatukas Ž, Ittu M, Kaur N (2017) Characterization of *Pyrenophora tritici-repentis* (tan spot of wheat) races in Baltic States and Romania. *The Plant Pathology Journal* **33**:133-139.
6. Wiersma AT, Brown LK, Brisco EI, Liu TL, Childs KL, Poland JA, **Sehgal SK**, Olson EL (2016) Fine mapping of the stem rust resistance gene SrTA10187. *Theor Appl Genet* **128**: 2369-2378.
7. Gong W, Gong W, HanR, Li G, **Sehgal SK**, Li H, Liu H, Song J, Song G, Liu C, Liu J (2016) Chromosome arm-specific markers from *Aegilops searsii* permits targeted introgression. *Biologia* **71**:87-92.
8. Chapman JA, Mascher M, Buluç AN, Barry K, Georganas E, Session A, Strnadova V, Jenkins J, **Sehgal S**, Oliker L, Schmutz J, Yelick KA, Scholz U, Waugh R, Poland JA, Muehlbauer GJ, Stein N, Rokhsar DS (2015) A whole-genome shotgun approach for assembling and anchoring the hexaploid bread wheat genome. *Genome Biol.* **16**:26.
9. Liu S, **Sehgal SK**, Lin M, Li J, Trick H, Gill BS, Bai G (2015) Independent mis-splicing mutations in TaPHS1 causing loss of pre-harvest sprouting (PHS) resistance during wheat domestication. *New Phytologist* **208**:928-35.
10. Chhuneja P, Yadav B, Stirnweis D, Hurni S, Kaur S, Elkot AF, Keller B, Wicker T, **Sehgal SK**, Gill BS, Singh KS (2015) Fine mapping of a new powdery mildew resistance gene *PmTb7A* and a new allele of *Pm1Tb* in *Triticum boeoticum* and identification of STS markers suited for MAS using the survey sequence data of chromosome 7AL. *Theor Appl Genet* **128**:2099-2111.
11. Cainong JC, Bockus WW, Feng Y, Chen P, Qi L, **Sehgal SK**, Danilova TV, Koo D, Friebe B, Gill BS (2015) Chromosome engineering, mapping, and transfer of native grass resistance to Fusarium Head Blight disease into wheat. *Theor Appl Genet* **128:**1019-1027.
12. Koo D-H, **Sehgal SK**, Friebe B, Gill BS (2015) Structure and stability of telocentric chromosomes in wheat. *PLOSONE* **10**(9): e0137747.
13. Jugulam M, Niehues K, Godar AS, Koo DH , Danilova TV , Friebe BR , **Sehgal SK** , Varanasi V, Wiersma A, Westra P, Stahlman P, Gill BS (2014) Tandem Amplification of a Chromosomal Segment Harboring EPSPS Locus Confers Glyphosate Resistance in Kochia scoparia. *Plant Physiol*.166: 1200-1207.
14. Tiwari VK, Wang S, **Sehgal S**, Vrána J, Friebe B, Kubaláková M, Chhuneja P, Doležel J, Akhunov E, Kalia B, Sabir J, Gill BS (2014) SNP discovery and mapping alien introgressions in wheat. *BMC Geno*mics 15: 274.
15. Gawroński P, Ariyadasa R, Poursarebani N, Himmelbach A, Kilian B, Stein N, Steuernagel B, Hensel G, Kumlehn J, **Sehgal SK**, Gill BS, Gould P, Hall A, Schnurbusch T (2014) A Distorted Circadian Clock Causes Early Flowering and Temperature-Dependent Variation in Spike Development in the Eps-3Am Mutant of Einkorn Wheat. *Genetics* 196:1253-1261.
16. Liu S, **Sehgal SK**, Li J, Lin M, Trick H, Yu J, Gill BS, Bai G (2013) Cloning and Characterization of a Critical Regulator for Pre-Harvest Sprouting in Wheat. Genetics 195:263-273.
17. Luo M-C, Gu Y, You FM, Deal KD, MaY, Hu Y, Huo N, Wang Y, Wang J, Chen S, Jorgensen, CM, McGuire PE, Stein J, Ware D, McCombie R, Kianian SF, Martis MM Mayer K, **Sehgal SK**, Gill BS, Bevan M, Dolezel J, Anderson OD and Dvorak J (2013) Physical map and gene space sequence of Aegilops tauschii, the source of wheat D genome, provide insights into the evolution of grass genomes. *Proc. Natl. Acad. Sci*. 110: 7940-7945.
18. Akhunov E\*, **Sehgal S**\*, Liang H, Wang S, Akhunova A, Kaur G, Li W, Forrest KL, See D, Simkova H Hayden M, Luo M-C, Farris J, Dolezel J, Gill BS (2013) Comparative analysis of orthologous genes in grass genomes reveals the accelerated rates of alternative splicing and coding sequence evolution in polyploid wheat. *Plant Physiol* 161:252–265.
19. Brenchley R, Spannagl M, Pfeifer M, Barker GLA, D’Amore R, Allen AM, McKenzie N, Kramer K, Kerhornou A, Bolser D, Kay S, Waite D, Trick M, Bancroft I, Gu Y, Huo N, Luo M-C, **Sehgal S**, Gill B, Kianian K, Anderson O, Kersey P, Dvorak J, McCombie WR, Hall A, Mayer KFX, Edwards KJ, Bevan MW, Hall N (2012) Analysis of the bread wheat genome using whole-genome shotgun sequencing. *Nature* 491:705-710.
20. Sehgal SK, Li W, Rabinowicz PD, Chan A, Šimková H, Doležel J, Gill BS (2012) Chromosome arm-specific BAC end sequences permit comparative analysis of homoeologous chromosomes and genome of polyploid wheat. *BMC Plant Biology* **12**:64.
21. Rawat N, **Sehgal SK**, Joshi A, Rothe N, Wilson DL, McGraw N, Vadlani PV, Li W, Gill BS (2012) A diploid wheat TILLING resource for wheat functional genomics. *BMC Plant Biology* 12:205.
22. Kumar S, **Sehgal SK**, Joshi AK, Kumar U, Prasad PVV and Gill BS (2012) Genomic characterization of drought tolerance related traits in spring wheat. *Euphytica* 158:265-76.
23. Liu W, Thummasuwan S, **Sehgal SK**, Chouvarine P, Peterson DG (2011) Characterization of the genome of bald cypress. *BMC Genomics* **12**:553.
24. **Sehgal SK**, Gupta S, Kaur S, Sharma A, Bains NS (2011) A direct hybridization approach for gene transfer from Aegilops tauschii Coss. to Triticum aestivum L. *Plant Breeding* 130:98-100.
25. Gupta S, Kaur S, **Sehgal S**, Sharma A, Chhuneja P, Bains NS (2010) Genotypic variation for cellular thermotolerance in Aegilops tauschii Coss., the D genome progenitor of wheat. *Euphytica* 175: 373-381.
26. Liu C, Li G-R, **Sehgal SK**, Jia J-Q, Yang Z-J, Friebe B, Gill B (2010) Genomic divergence in the genus Dasypyrum: evidence from molecular phylogenetic analysis and in situ hybridization. Plant Systematics and Evolution 288:149–156.
27. Sharma S, Sreenivasulu N, Harshavardhan VT, Seiler C, Sharma S, Khalil ZN, Akhunov E, **Sehgal SK**, Röder MS (2010) Delineating the structural, functional and evolutionary relationships of sucrose phosphate synthase gene family II in wheat and related grasses. *BMC Plant Biology* 10:134.
28. **Sehgal SK**, Kaur G, Sharma I, Bains NS (2008) Development and molecular marker analysis of Karnal bunt resistant near isogenic lines in bread wheat variety PBW 343. Indian J Genet *Plant Breed* 68: 21-25.
29. Singh S, Sharma I, **Sehgal SK**, Bains NS, Guo Z, Nelson J, Bowden R (2007) Molecular mapping of QTLs for Karnal bunt resistance in two recombinant inbred populations of bread wheat. *Theor Appl Genet* 116: 147-154.
30. **Sehgal SK**, Kaur G, Gupta ML (2004) Induction of androgenesis and plant regeneration in Indian mustard (Brassica juncea L. Coss.) *J Pl Sci Res* 20: 125-27.

**Synergistic Activities**

My research is focused on developing of superior winter wheat germplasm and cultivars for SD and the region. I am working on identifying, transferring and mapping source of resistance to leaf rust, FHB, heat drought tolerance in wheat and wild relatives. I am also using next generation sequencing and novel technologies SNP discovery, and diversity analysis in wild and cultivated wheat.

**Collaborators & Other Affiliations**

**Collaborators and Co-Editors**

Akhunov, Eduard (Kansas State University), Ali, Shaukat (SDSU), Bai, Guihua (USDA ARS), Bowden, Robert (USDA ARS), Dubcovsky, Jorge (University of California, Davis), Friebe, Bernd (Kansas State University), Gill Bikram (Kansas State University), Poland Jesse (Kansas State University), Schnurbusch, Thorston (IPK, Gatersleben).

**Graduate Advisors and Postdoctoral Sponsors**:

Ph.D. Dr Navtej S. Bains, Punjab Agricultural University, Ludhiana

Post-graduate Dr. Bikram S. Gill, Kansas State University, Manhattan

Dr. Robert Bowden, USDA–ARS, Manhattan

**Thesis Advisor and Postgraduate-Scholar Sponsor:**

Jagdeep S Sidhu, Sai Mukund, Girma Ayana, Rame Al Tameemi, Jyotirmoy Halder.