



**World Bank - ICAR funded
National Agricultural Higher Education Project (NAHEP)
Centre for Advanced Agricultural Science & Technology (CAAST)
Sponsored Short Term Training Programme**

**“Pathophenotyping and Genome guided Characterization of Rust fungi infecting
Wheat and other Cereals”**

January 22 - February 01, 2020

**Division of Plant Pathology and Division of Genetics
ICAR-Indian Agricultural Research Institute, New Delhi-110012**

Course Director: Dr. Vaibhav K. Singh

Course Coordinators: Drs. Rashmi Aggarwal, M.S. Saharan and Shailendra Jha

Training Schedule

Date	Time	L/P	Topic	Speaker
<u>Day 1</u> 22 nd January 2020 (Wednesday)	9:30 AM - 1:00 PM	-	Registration of candidates, Inauguration, Welcome remarks, Course overview, Chief guest remarks, Introduction to the faculty	-
	2:00 PM - 5:00 PM	-	Orientation for laboratory / glasshouse / field experiments on wheat rust pathogens and practical format	Dr. Vaibhav K. Singh, Dr. Rashmi Aggarwal, Dr. M.S. Saharan Dr. Shailendra Jha
<u>Day 2</u> 23 rd January 2020 (Thursday)	9:30 AM - 1:00 PM	L1	Global importance of wheat & barley with special emphasis on research & development in India	Dr. G.P. Singh, ICAR-IIWBR, Karnal
		L2	Coordinated efforts for development of rust resistant wheat & barley varieties	Dr. Gyanendra Singh, ICAR-IIWBR, Karnal
	2:00 PM - 5:00 PM	L3	Overview of the Cereal rust fungi	Dr. Vaibhav K. Singh, ICAR-IARI, New Delhi
		P1	Survey, sampling, establishment, multiplication, uredospore collection, inoculation, maintenance and storage of rust pathogens	Dr. Vaibhav K. Singh, ICAR-IARI, New Delhi
<u>Day 3</u> 24 th January 2020 (Friday)	9:30 AM - 1:00 PM	L4	Genera of rust fungi in India - Taxonomy and preservation	Dr. Deeba Kamil, ICAR-IARI, New Delhi
		L5	Molecular phylogeny: Principles and practice	Dr. Anirban Roy, ICAR-IARI, New Delhi
	2:00 PM - 5:00 PM	P2	Pathotype (race) analysis of wheat rust pathogens	Dr. Vaibhav K. Singh, ICAR-IARI, New Delhi
<u>Day 4</u> 25 th January 2020 (Saturday)	9:30 AM - 1:00 PM	L6	Concepts of rust resistance in wheat	Dr. Vaibhav K. Singh, ICAR-IARI, New Delhi
		L7	Breeding for rust resistance in wheat - a molecular genetics & MAS approach	Dr. Vinod, ICAR-IARI, New Delhi
	2:00 PM - 5:00 PM	P3	Screening and phenotyping seedling and adult plant resistance to rusts in wheat	Dr. Vaibhav K. Singh, ICAR-IARI, New Delhi
<u>Holiday</u> 26 th January 2020 (Sunday)	Holiday (Republic Day)			
<u>Day 5</u> 27 th January 2020 (Monday)	9:30 AM - 1:00 PM	L8	Crop health monitoring and surveillance of wheat diseases	Dr. M.S. Saharan, ICAR-IARI, New Delhi
		L9	Pathogenic and molecular variability among Indian pathotypes of <i>Puccinia</i> spp	Dr. P.L. Kashyap, ICAR-IIWBR, Karnal
	2:00 PM - 5:00 PM	P4	Development of PCR based assay for detection of <i>Puccinia striiformis tritici</i> causing stripe rust in wheat	Dr. Vaibhav K. Singh, Dr. Rashmi Aggarwal ICAR-IARI, New Delhi
<u>Day 6</u> 28 th January 2020	9:30 AM - 1:00 PM	L10	Physiological specialization in wheat rusts and identification of pathotypes	Dr. S.C. Bhardwaj, ICAR-IIWBR, RS, Flowerdale, Shimla

(Tuesday)		L11	Isolation of new pathotypes of <i>Puccinia</i> spp, coding and decoding of pathotype names	Dr. S.C. Bhardwaj, ICAR-IIWBR, RS, Flowerdale, Shimla
		L12	Multilocus sequence typing of fungal plant pathogens	Dr. M.S. Gurjar, ICAR-IARI, New Delhi
	2:00 PM - 5:00 PM	P5	Molecular characterization and phylogenetic relationship among Indian pathotypes of <i>Puccinia striiformis tritici</i> causing stripe rust in wheat	Dr. Vaibhav K. Singh, Dr. Rashmi Aggarwal ICAR-IARI, New Delhi
<u>Day 7</u> 29 th January 2020 (Wednesday)	9:30 AM - 1:00 PM	L13	Unravelling the genomes of bread wheat and its leaf rust pathogen for accelerated wheat improvement	Dr. Nagendra K. Singh, ICAR-NIPB, New Delhi
		L14	Strategies for genome sequencing of fungal plant pathogens	Dr. A. Kumar, ICAR-IARI, New Delhi
	2:00 PM - 5:00 PM	P6	Sequencing of plant genome: a brief overview of different sequencing chemistries	Dr. Kishor Gaikwad ICAR-NIPB, New Delhi
<u>Day 8</u> 30 th January 2020 (Thursday)	9:30 AM - 1:00 PM	L15	Genetics of rusts resistance in wheat	Dr. A.N. Mishra ICAR-Emeritus Scientist, ICAR-IARI, RS, Indore
		L16	Role of epigenetics in wheat rusts resistance	Dr. Neelu Jain ICAR-IARI, New Delhi
	2:00 PM - 5:00 PM	P7	Bioinformatic software and tools for Next Generation Sequencing (NGS) data analysis	Dr. Sandhya Sanand ICAR-NIPB, New Delhi
<u>Day 9</u> 31 st January 2020 (Friday)	9:30 AM - 1:00 PM	L17	Identification, mapping and fast track introgression of rust resistant genes in wheat (<i>Triticum aestivum</i> L.)	Dr. H. Prasanth Babu, ICAR-IARI, New Delhi
		L18	Genetic analysis and molecular mapping of rust resistance genes	Dr. Shailendra Jha, ICAR-IARI, New Delhi
	2:00 PM - 5:00 PM	P8	Molecular characterization of rust resistance genes in wheat	Dr. Shailendra Jha/ Dr. Vaibhav K. Singh, ICAR-IARI, New Delhi
<u>Day 10</u> 01 st February 2020 (Saturday)	9:30 AM - 1:00 PM	L19	Pathogenomics of major fungal pathogens of wheat, development of their diagnostics and their management	Dr. Rashmi Aggarwal, ICAR-IARI, New Delhi
		L20	Biotic constraints in barley production with special emphasis on rust fungi	Dr. Sudheer Kumar, ICAR-IIWBR, Karnal
	2:00 PM - 5:00 PM	-	Evaluation of Trainees Concluding Discussion Valedictory Function Distribution of Certificates	-

L : Lecture, P : Practical