VDHR-NWW CP Milestone Matrix – 2016-2017

Variety Development Objectives for 2016 and 2017

1. Increase acreage planted to varieties exhibiting improved FHB resistance.
2. Increase efficiency of individual breeding programs to develop and release FHB resistant varieties.
3. Develop new breeding technologies and germplasm to further enhance short-term and long-term improvement of FHB resistance and to efficiently introgress effective resistance genes into breeding germplasm.

State	#	Action	Outputs	Timeline
All	1	Make 2,400 crosses each year focused on combining yield and FHB resistance	2400 breeding populations for selection	Yr1: by May 2016 Yr2: by May 2017
All	1	Apply phenotypic selection and advance $F_2 – F_5$ populations	New inbred lines having yield potential and FHB resistance	Yr1: Jun-Jul 2016 Yr2: Jun-Jul 2017
All	1	Plant FHB nurseries with 7,400 new advanced inbred lines in FHB nurseries in addition to advanced lines undergoing mult-year evaluations	FHB nurseries for phenotypic evaluations and generating valuable disease data	Yr1: Sep – Oct 2016 Yr2: Sep – Oct 2017
All	1	Increase seed of 15 to 20 new varieties	Breeder seed will be passed on for foundation seed production. The wheat community will be provided with wheat cultivars having high levels of FHB resistance	Yr1: plant Sep-Oct 2016, harvest Jun 2017 Yr2: plant Sep-Oct 2017, harvest Jun 2018
All	1	Collect FHB disease data	Lines are identified that have high levels of resistance and yield potential. Across programs,	Yr1: Jun-Jul 2016 Yr2: Jun-Jul 2017
MO	1	5000 to 8000 individual plants from the Missouri breeding program	Data provided for selections in the field	Yr1: Jan – Mar 2016 Yr2: Jan – Mar 2017
OH	1	Inoculate 8,000 headrows with conidia	Selection for FHB resistance is applied in breeding headrows	Yr1: Jun-Jul 2016 Yr2: Jun-Jul 2017
MI	1	Inoculate 700 F_2 bulk populations with grain spawn	Selection applied for FHB resistance in early generation segregating populations	Yr1: May 2016 Yr2: May 2017
KY, MI	1	Use optical sorting to cull FHB-infected kernels from breeding populations	Selection applied for FHB resistance in early generation segregating populations	Yr1: August 2016 Yr2: August 2017
All	1	Identify lines with high levels of resistance for uniform FHB	Germplasm with strong resistance will be shared	Yr1: August 2016 Yr2: August 2017

State	#	Action	Outputs	Timeline
		nurseries	across regional programs	
All	1	Submit 7,400 samples for DON analysis	Valuable data for selection in breeding programs, research programs and variety planting decisions	Yr1: Jan – Mar 2016 Yr2: Jan – Mar 2017
All	2	Plant FHB nurseries containing uniform nurseries, cooperative FHB nurseries and official variety trials	FHB nurseries available for phenotypic evaluations and generating valuable disease data	Yr1: Sep-Oct 2016 Yr2: Sep-Oct 2017
All	2	Collect FHB disease data	Lines are identified that have high levels of resistance an yield potential. Across programs,	Yr1: Jun-Jul 2016 Yr2: Jun-Jul 2017
All	2	Reporting of data from uniform nurseries, cooperative FHB nurseries and official variety trials	Enables selection of parents for crossing programs, communication across programs and decisions to plant resistant varieties	Yr1: Jun-Aug 2016 Yr2: Jun-Aug 2017
NC	2	Gentoyping of uniform FHB nurseries for major FHB resistance QTL, phenology and quality related genes	Valuable information is provided to breeding programs for parent selection and line advancement	Yr1: May-Aug 2016 Yr2: May-Aug 2017
OH	2	Compare the FHB resistance of current entries in the uniform scab trails to that of entries in past trials. Prepare reports of Uniform FHB nurseries	Results are made available to FHB nursery cooperators	Yr1: Jul-Aug 2016 Yr2: Jul-Aug 2017
IN, IL KY,MI, MO,NY	2	Perform selections and hybridizations in male-sterile recurrent selection populations	Rapid generation advancement and recurrent selection for FHB resistance	Yr1: Jun-Jul 2016 Yr2: Jun-Jul 2017
All	2	Conduct marker-assisted selection for exotic QTL including *Fhb1*, 2D, and 5A QTL as well as QTL derived from native sources	Populations are enriched for resistance QTL. Advanced inbreds are identified that carry individual QTL and combinations	Yr1: various times, 2016 Yr2: various times, 2017
IL	3	GS model training, prediction and selection in breeding populations	Rapid generation cycling and efficient selection of lines carrying high levels of FHB resistance	Yr1: various times, 2016 Yr2: various times, 2017
NC	3	GS model training, prediction and development of GEBVs using uniform nursery phenotypic data and GBS-SNPs	Prediction of FHB resistance levels facilitating parent selection for breeding programs	Yr1: various times, 2016 Yr2: various times, 2017

State	#	Action	Outputs	Timeline
MI,NY, OH	3	Phenotyping of lines derived from two cycles of GS	FHB data on lines produced exclusively from GS	Yr1: Jun-Jul 2016 Yr2: Jun-Jul 2017
MI,NY, OH	3	Generate a third intercross generation using parents selected based on GEBV	Rapid cycling and a subsequent round of selection applied for FHB resistance	Yr1: Jan-Feb 2016 Yr2: Jan-Feb2017
MO	3	Phenotyping of RIL populations to characterize resistance in Bess and MO080104	New sources of resistance and selectable QTL will be available for regional FHB resistance breeding	Yr1: Jun-Aug 2016 Yr2: Jun-Aug 2017
IN	3	Phenotyping of RIL populations to characterize resistance from various sources including INW412 and Huapei 57-2	New sources of resistance and selectable QTL will be available for regional FHB resistance breeding	Yr1: Jun-Aug 2016 Yr2: Jun-Aug 2017