Supplementary Materials:

Supplementary Table 1. Examples of transgenic approaches used for enhancing disease resistance in wheat.

Disease	R gene(s)	Strategy	Reference
Stripe Rust	*Yr10*	Overexpression of NLR protein	(Liu et al., 2014)
Stem Rust	*Sr13*	Overexpression of a coil-coiled NLR protein	(Zhang et al., 2017)
	Sr22b	Broad-spectrum resistance via transgenics	(Luo et al., 2022)
	Sr45, Sr55, Sr50, Sr35, Sr22	Multi-gene construct	(Luo et al., 2021)
	Sr22, Sr33, Sr35, Sr45	Multi-gene construct	(Hatta et al., 2021)
	Sr62	Tandem kinase resistance	(Yu et al., 2022)
	Sr43	Protein kinase resistance	(Yu et al., 2023)
	Sr9	NLR resistance	(Zhang et al., 2023)
	SrTA1662	Race-specific resistance	(Gaurav et al., 2022)
Leaf Rust	*Lr47*	Coil-coiled NLR gene resistance	(Li et al., 2023)
Multi-pathogen	*Lr67* (G144R variants)	Enhanced resistance via mutation	(Milne et al., 2024)
	HvWRKY6	Elicits salicylic acid signaling	(Li et al., 2022)
	Hvchi26	Barley chitinase for rust and mildew resistance	(Eissa et al., 2017)
	TaCERK1, AtCERK1	Chitin receptor-mediated resistance	(Wang et al., 2024)
Leaf Rust & Common Root Rot	*TaTLP1*	Thaumatin-like protein resistance	(Wang et al., 2020)
Powdery Mildew	*Pm17*	Transgenic overexpression	(Koller et al., 2024)
	HSP90.2	Protein folding pathway resistance	(Yan et al., 2023)
	TiAP1	Aspartic protease protein resistance	(Yang et al., 2022)
Fusarium Head Blight	*TaUGT6*	UDP-glycosyltransferase resistance	(He et al., 2020)
	TaFROG	Stabilization of TaSnRK1α	(Jiang et al., 2020)

	NbRXEG1	Heterologous expression of tobacco gene	(Wang et al., 2023)
	Fhb7	Glutathione S-transferase resistance	(Zhao et al., 2024)
	TaCAT2	Lesion mimic	(Han et al., 2024)
	TaUGT3	Resistance to DON	(Lulin et al., 2010)
	TaICSA	Enhanced salicylic acid levels	(Zhang et al., 2024)
	TaPIP2;10	Aquaporin gene resistance	(Wang et al., 2021)
Fusarium Crown Rot	*TdRCA1*	Resistance via a transcription factor	(Li et al., 2024)
Fusarium Head Blight & Crown Rot	*HvUGT13248, AcPMEI, PvPGIP2*	Transgene pyramiding	(Mandalà et al., 2021)
Sharp Eyespot	*TaSTT3b-2B, TaRCR1*	Resistance via overexpression	(Zhu et al., 2017, 2022)
Septoria Tritici Blotch	*Stb16q*	Resistance via gene overexpression	(Saintenac et al., 2021)
Chinese Wheat Mosaic Virus	*TaTHI2*	Ca^{2+}-dependent protein kinase interaction	(Yang et al., 2024)
Rice Black-Streaked Dwarf Virus	*qMrdd2*	Transcription factor ZmGLK36	(Xu et al., 2023)
Wheat Yellow Mosaic Virus	*NIb8*	Antisense virus polymerase gene	(Chen et al., 2014)
Wheat Streak Mosaic Virus & Triticum Mosaic Virus	RNAi hybrid *NIb*	RNAi-mediated dual resistance	(Tatineni et al., 2020)

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