

**Table S3.** Forecasted prediction accuracy (forecasted value  $\pm$  standard error) using deterministic equations devised by Wientjes ( $\rho^W$ ) and Daetwyler ( $\rho^D$ ) for seven agronomic traits for scenario sL using  $N_i = 50$  sampled from the elite flint (EF) lines, or doubled-haploid (DH) lines from the landraces GB, SF, SM, and WA, as well as the means across traits.

Trait	EF	Landraces				Mean
		GB	SF	SM	WA	
		$\rho^W$				
Early vigor	0.43±0.15	0.21±0.04	0.35±0.07	0.37±0.07	0.45±0.08	<b>0.35</b>
Female flowering	0.39±0.14	0.16±0.03	0.31±0.07	0.37±0.07	0.37±0.07	<b>0.30</b>
Fusarium ear rot	0.58±0.22	0.27±0.04	0.32±0.07	0.38±0.07	0.44±0.08	<b>0.35</b>
Plant height	0.50±0.18	0.23±0.04	0.36±0.07	0.33±0.06	0.42±0.08	<b>0.33</b>
Grain yield	0.49±0.18	0.22±0.04	0.34±0.07	0.36±0.07	0.41±0.07	<b>0.33</b>
Oil content	0.40±0.14	0.16±0.03	0.32±0.07	0.35±0.07	0.36±0.06	<b>0.30</b>
Protein content	0.48±0.18	0.21±0.04	0.33±0.07	0.35±0.07	0.42±0.08	<b>0.33</b>
		$\rho^D$				
Early vigor	0.55±0.08	0.16±0.07	0.25±0.08	0.33±0.07	0.42±0.08	<b>0.29</b>
Female flowering	0.56±0.08	0.17±0.08	0.31±0.09	0.34±0.07	0.49±0.08	<b>0.33</b>
Fusarium ear rot	0.31±0.09	0.13±0.06	0.30±0.09	0.32±0.07	0.44±0.08	<b>0.30</b>
Plant height	0.51±0.09	0.15±0.07	0.24±0.08	0.37±0.07	0.46±0.09	<b>0.30</b>
Grain yield	0.51±0.09	0.15±0.07	0.27±0.08	0.35±0.07	0.47±0.09	<b>0.31</b>
Oil content	0.56±0.08	0.18±0.08	0.30±0.09	0.36±0.07	0.49±0.08	<b>0.33</b>
Protein content	0.52±0.09	0.16±0.07	0.29±0.09	0.36±0.07	0.45±0.08	<b>0.32</b>