

Table S1. Accuracy of CGM-WGP grain yield predictions of test DH lines with increasing bias in prior hyperparameters.

| Estimation Env. | Prediction Env. | Prior Bias | | |
|-----------------|-----------------|------------|------|------|
| | | 0% | 10% | 25% |
| 2012 | 2012 | 0.78 | 0.77 | 0.73 |
| | 2013 | 0.49 | 0.48 | 0.38 |
| 2013 | 2012 | 0.44 | 0.42 | 0.29 |
| | 2013 | 0.75 | 0.75 | 0.72 |

A prior bias of 10% means that the difference between the hyperparameters of the prior distributions and the true population parameters are 10% of the latter, on average. Results for prior bias of 10% are repeated from Table 2 in the main manuscript, for ease of reference. Results are average over 50 replications.