

Supplemental material

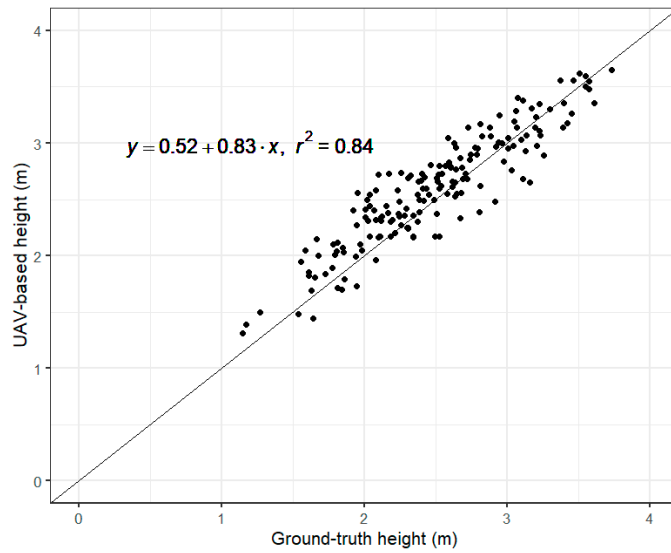


Figure S1. Canopy height validation implemented at DAP 72 in the growing season.

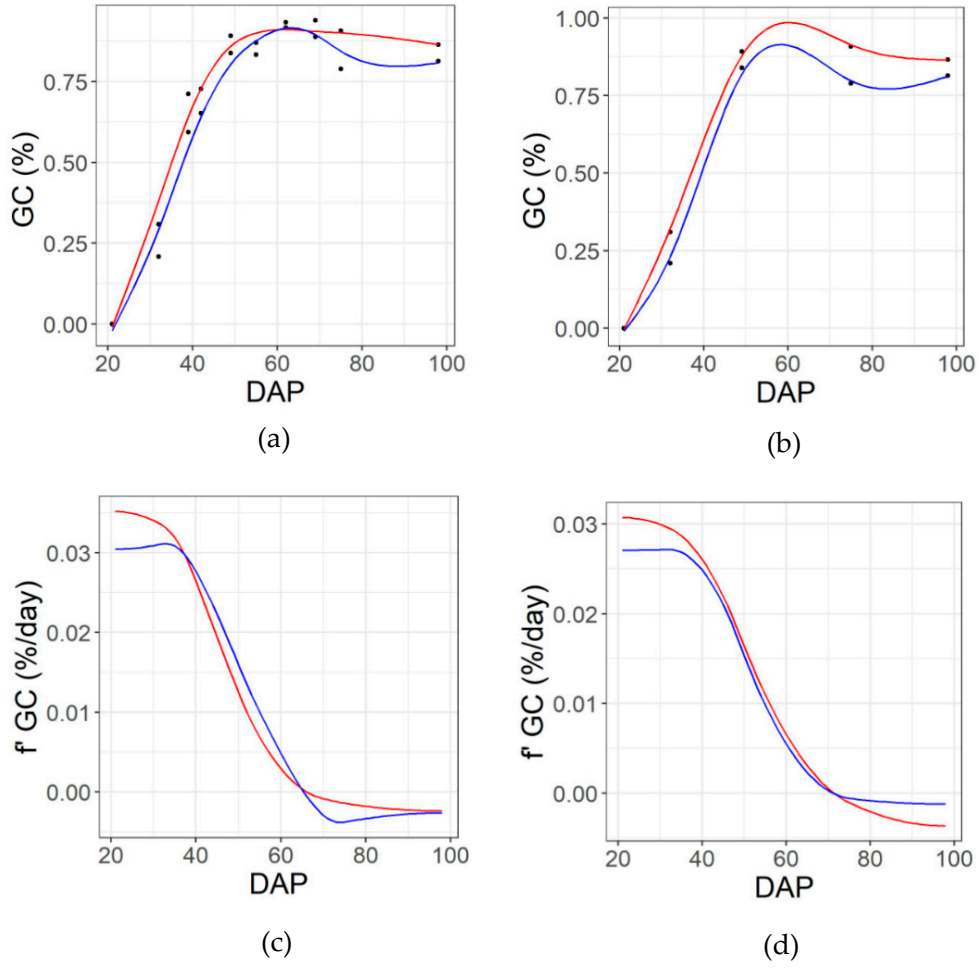


Figure S2. Example seasonal time courses of green coverage (GC) and the rate of change of green coverage ($f' CSM$) from 20-98 days after planting (DAP) for genotypes that are the 25th (blue line) and 75th percentile (red line) for yield, based on imaging performed on 10 dates across the season (a, c) or a subset of 5 dates across the season (b, d). Black dots consider individual dates of aerial data collection. Solid lines denotes spline solution for GC and $f' GC$.

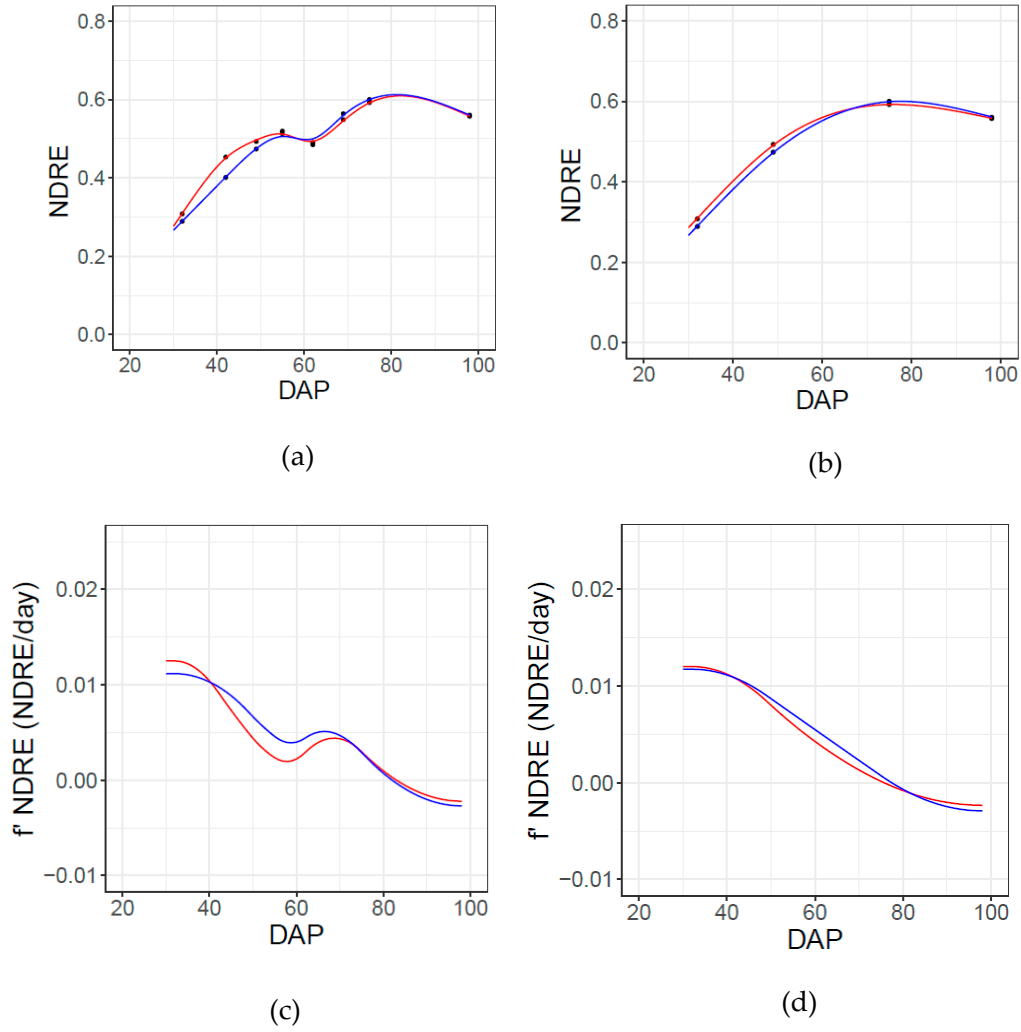


Figure S3. Example seasonal time courses of normalized difference rededge index (NDRE) and the rate of change of NDRE (f' NDRE) from 20-98 days after planting (DAP) for genotypes that are the 25th (blue line) and 75th percentile (red line) for yield, based on imaging performed on 10 dates across the season (a, c) or a subset of 5 dates across the season (b, d). Black dots consider individual dates of aerial data collection. Solid lines denotes spline solution for NDRE and f' NDRE, correspondently.

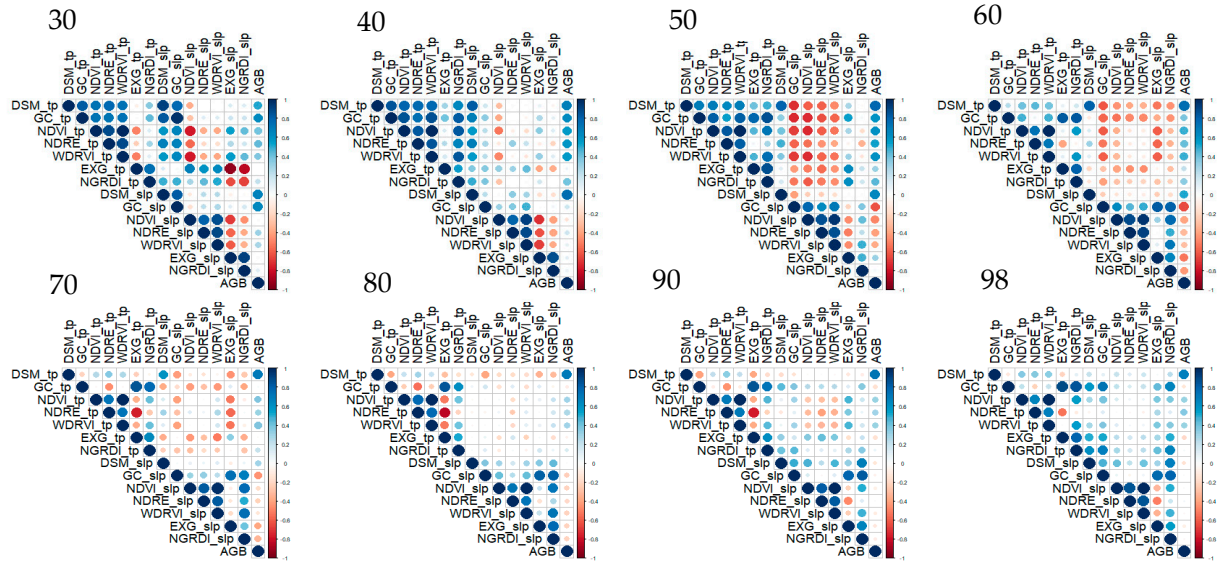


Figure S4. Correlation coefficient (r) between spectral, geometrical variables, and AGB for full (n=10) flights scenario A at predefined DAPs.

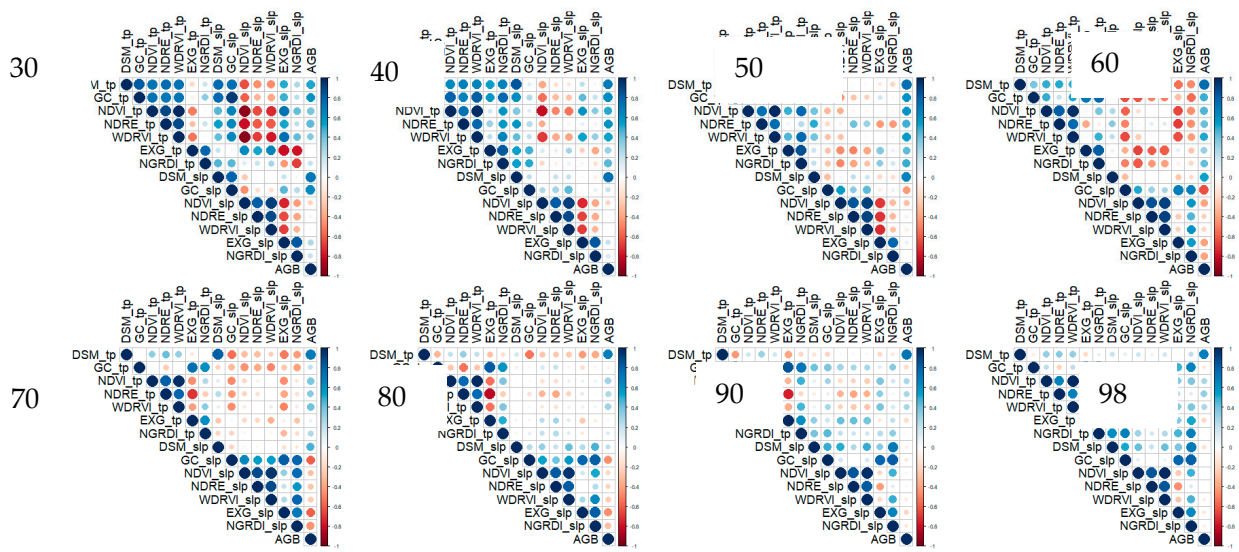


Figure S5. Correlation coefficient (r) between spectral, geometrical variables, and AGB for full ($n=10$) flights scenario A at predefined DAPs.

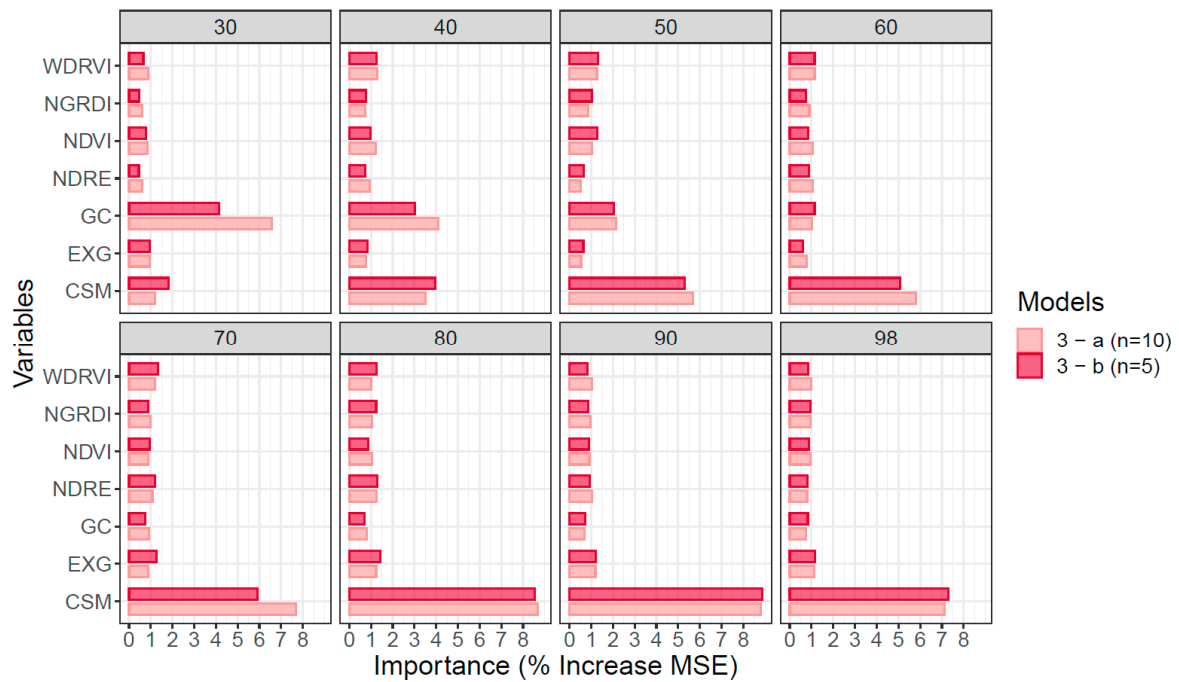


Figure S6. Variable importance analysis on predictions of end-of-season AGB by the Random Forest (RF) Model 1 (single time-point) using data from flight pattern A (10 dates, blue) and flight pattern B (subset of 5 dates, purple). The relative sensitivity of the mean square error (MSE) for AGB to a single standard deviation in a given trait is shown for 30, 40, 50, 60, 70, 80, 90 and 98 days after planting.

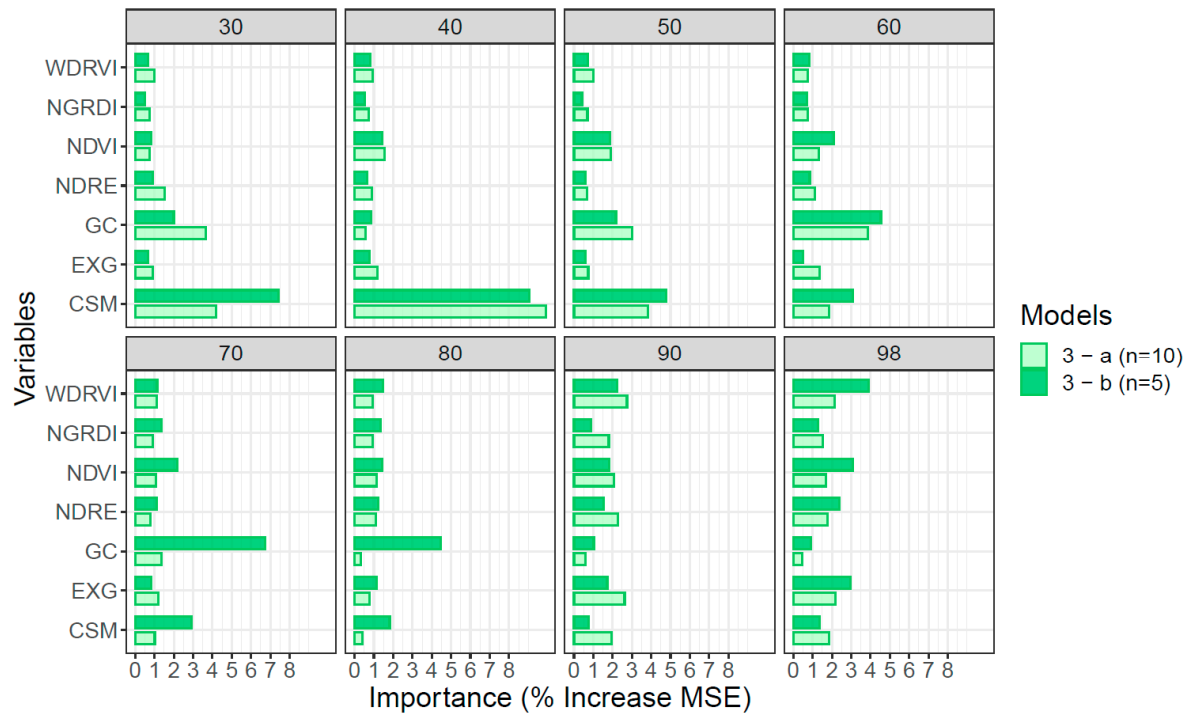


Figure S7. Variable importance analysis on predictions of end-of-season AGB by the Random Forest (RF) Model 2 (growth dynamics) using data from flight pattern A (10 dates, blue) and flight pattern B (subset of 5 dates, purple). The relative sensitivity of the mean square error (MSE) for AGB to a single standard deviation in a given trait is shown for 30, 40, 50, 60, 70, 80, 90 and 98 days after planting.

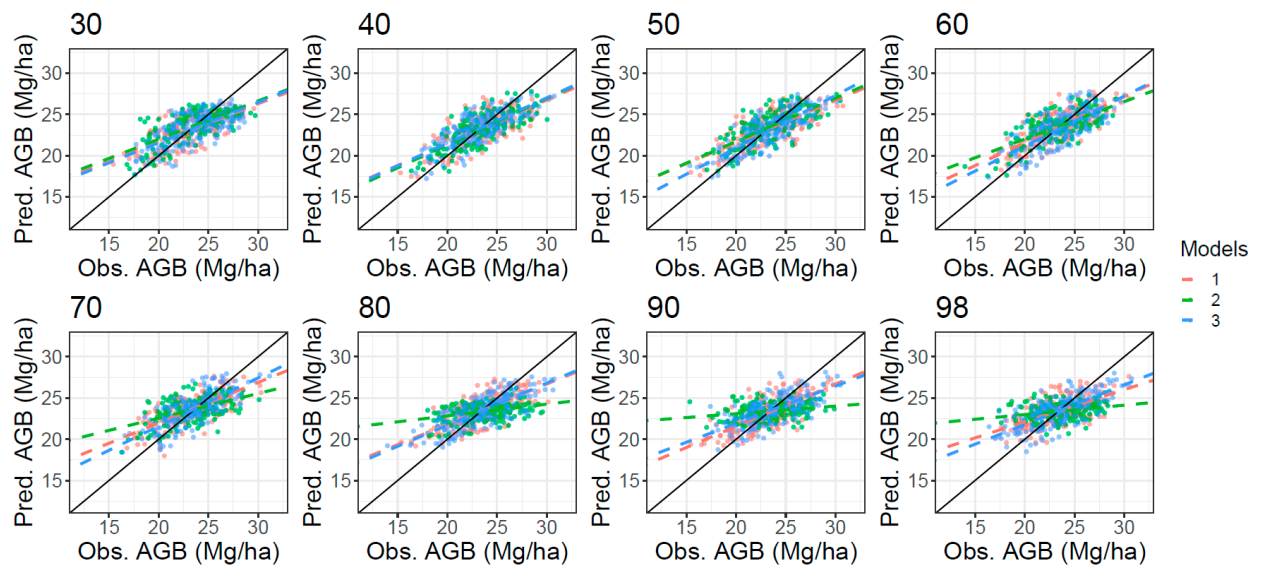


Figure S8. Observed and predicted AGB values in testing dataset for full (n=10) and reduced (n=5) number of flights for model 1, 2, and 3.

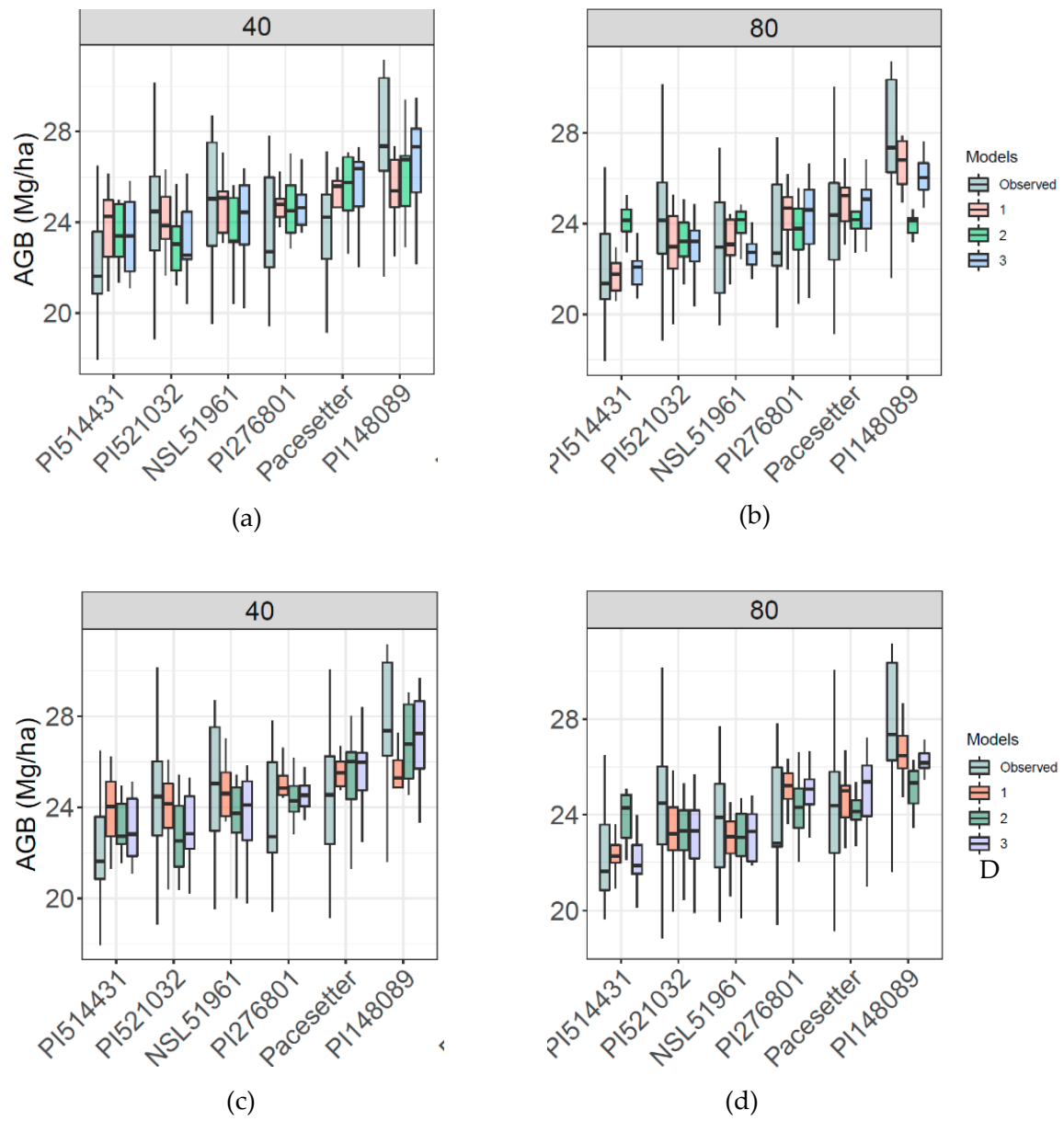


Figure S9. Observed and predicted AGB values of models 1,2,3 at highly replicated genotypes (n=16) for full flights pattern (a,b) and for reduced flight pattern (c,d) at early season DAP 40 and late season DAP 80.