

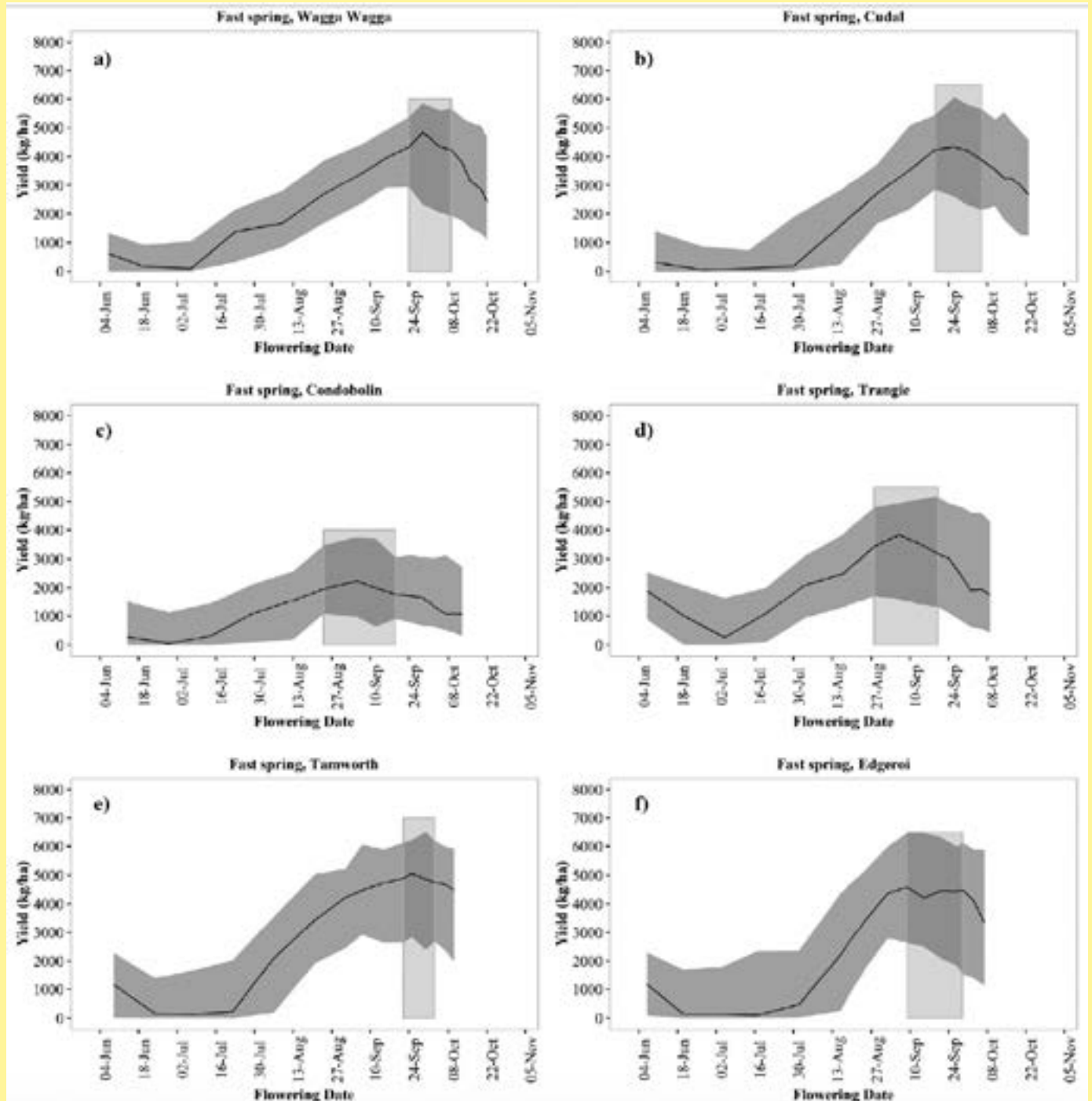
genotype and sowing date combinations that flower in late-August to mid-September at Condobolin, late September to mid-October in Wagga Wagga and late-September to early-October at Tamworth capable of achieving the highest yields. This aligns with APSIM simulations in Figure 1. In 2018, there was significant variation in grain yields for genotype x sowing date combinations which flowered within the optimal period at all sites (Figure 2).

At the Wagga Wagga site, optimal flowering time and highest grain yields were achieved by both winter type DS Bennett sown early-late April and the best performing spring types sown

early-May (e.g. Beckom sown May 3). Severe yield penalties occurred when fast developing spring wheats were sown prior to May and exposed to severe frost conditions; and when slow winter genotypes, characterised as having a strong vernalisation and photoperiod response, flowered too late and grain filling occurred under terminal drought conditions (Figure 2).

At the Condobolin site, stable grain yields were achieved across sowing dates from slower spring genotypes (e.g. Cutlass and EGA Gregory), or fast winter type Longsword, as they were exposed to fewer frost events during reproductive development

**FIGURE 1: The optimal flowering period (OFP) for a fast spring cultivar of wheat determined by APSIM simulation using methods of Flohr et al. (2017) for a) Wagga Wagga, b) Cudal, c) Condobolin, d) Trangie, e) Tamworth and f) Edgeroi**



Black lines represent frost and heat limited yield (kg/ha), with standard deviation in grey. Shaded columns are the estimated OFP defined as  $\geq 95\%$  of the maximum mean yield.