

## Supplementary material

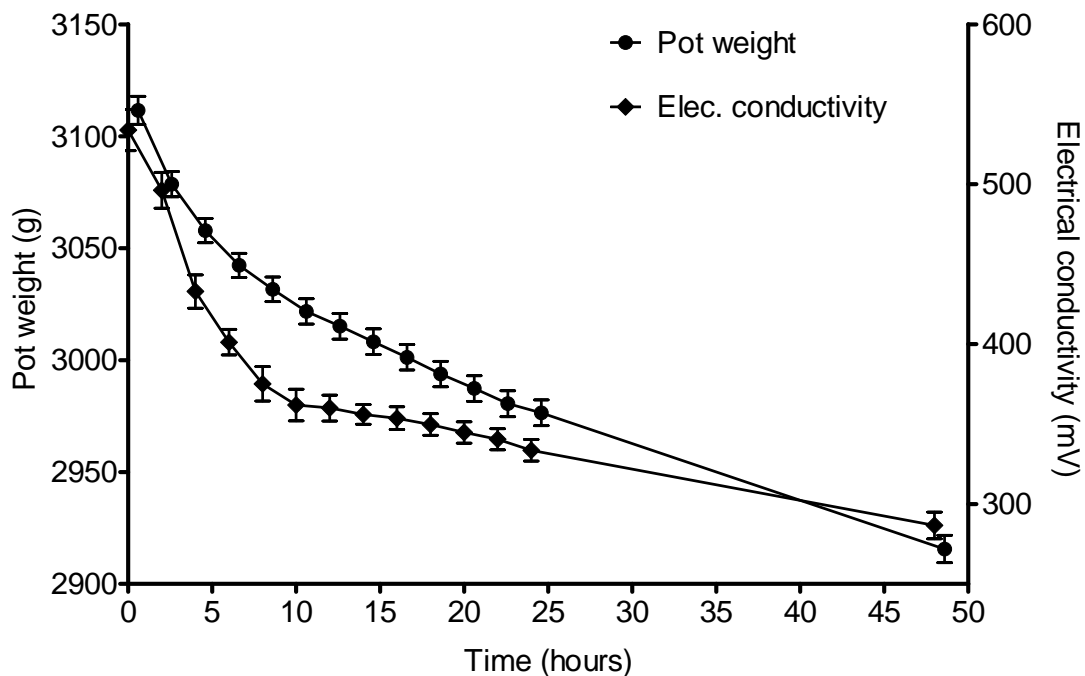
### Quantifying the relationship between temperature regulation in the ear and floret development stage in wheat (*Triticum aestivum* L.) under heat and drought stress

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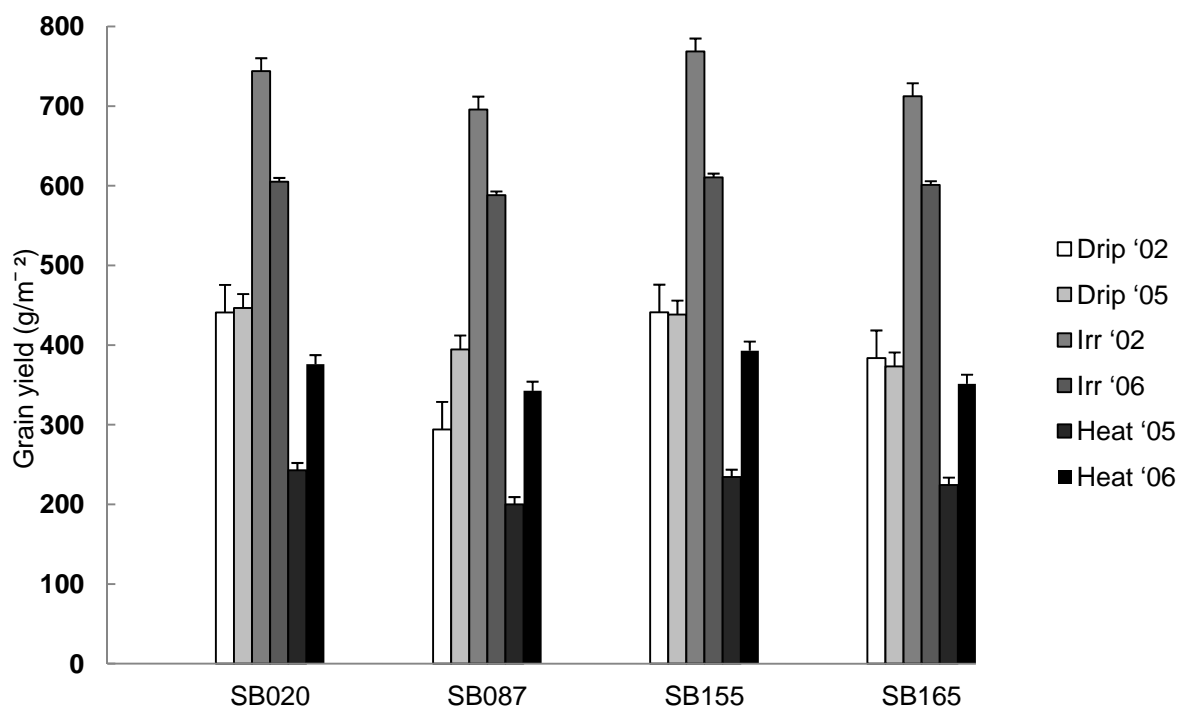
**Fig. S1.** Water loss from the potting mix used in this study. Water loss was measured on gravimetric basis (left Y axis), as well as be measuring electrical conductivity (right Y axis) over a 48 h period at constant 20°C. For the first 24 h, pots were weighed and EC was recorded using a calibrated Theta probe (Delta T Devices, Cambridge, UK) every two hours. A single reading was then taken at 48 h after irrigation was applied. The water loss from the pot over 24 h illustrates that sufficient water remains accessible to the plant between irrigation events, such that AET and photosynthesis observations made are not as a result of variation in water availability between irrigation events. Results based on 20 replicate pots. Error bars indicate standard error.



**Fig. S2.** Photographic illustrations of the four stages determined during anther scoring. During stage ‘1’, the anthers are very small, closely packed to each other in the glume and are green in colour. In stage ‘2’, the anthers have become slightly larger than they were during stage ‘1’. In addition, they have taken on a green/yellow colour. During stage ‘3’, the anthers are suspended on a filament and are bright yellow in colour. They may be contained within the glume or hang out of the glume. In stage ‘4’, the anthers are usually outside the glume. They have turned a distinctive white colour, making them easily recognisable from the bright yellow observed during stage ‘3’.



**Fig. S3.** Photographic illustrations of the three stages used for pistil scoring during the experiment. ‘Half-Fluffy’ is characterised by the pistil being tightly contained within the developing anthers. The ‘Fluffy’ stage has been reached when the white pistil is protruding outwards. ‘Post-Fluffy’ differs from the previous stage in that the pistil hangs out of the floret and the filaments of the pistil look damaged. Often pollen is seen coating the pistil at this stage. These differences are clearly visible.



**Fig. S4.** Graph showing yield data of four Seri/Babax lines (SB020, SB087, SB155 and SB165), grown under field conditions at CIMMYT's Obregon Experimental Station in NW Mexico between 2002-2006 (Adapted from Pinto *et al.* 2010). Table S1 describes the environmental conditions each trial was grown in. For the trial code, 'Drip' symbolises the drought treatment, 'Irr' symbolises the irrigated treatment and 'Heat' symbolises the heat stress trial. The number following the environment code denotes the year in which the trial was conducted e.g. Drip '02 is a Drought trial which took place during the 2002 growing season. Error bars indicate standard error.

**Table S1. Table adapted from Pinto *et al.* (2010) of the environmental conditions recorded during their study**

Total rainfall (mm), minimum temperature ( $T_{\min}$ ) and maximum temperature ( $T_{\max}$ ) recorded during anthesis for all six trials grown in the three environments tested: Drought (D), Heat (H) and Irrigation (I). For the trial code, the number following the environment code denotes the year in which the trial was conducted e.g. D02 is a Drought trial which took place during the 2002 growing season. Trials were conducted in NW Mexico at CIMMYT's Obregon Experimental Station

Trial code	$T_{\min}$ (°C)	$T_{\max}$ (°C)	Total rainfall (mm)
D02	7.5	27.8	56
D05	10.6	25.9	56
H05	12.3	34.8	65
H06	17.0	38.9	64
I02	7.9	27.3	56
I06	8.4	27.9	55