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Supplementary Material

Protecting cotton crops under elevated CO₂ from waterlogging by managing ethylene

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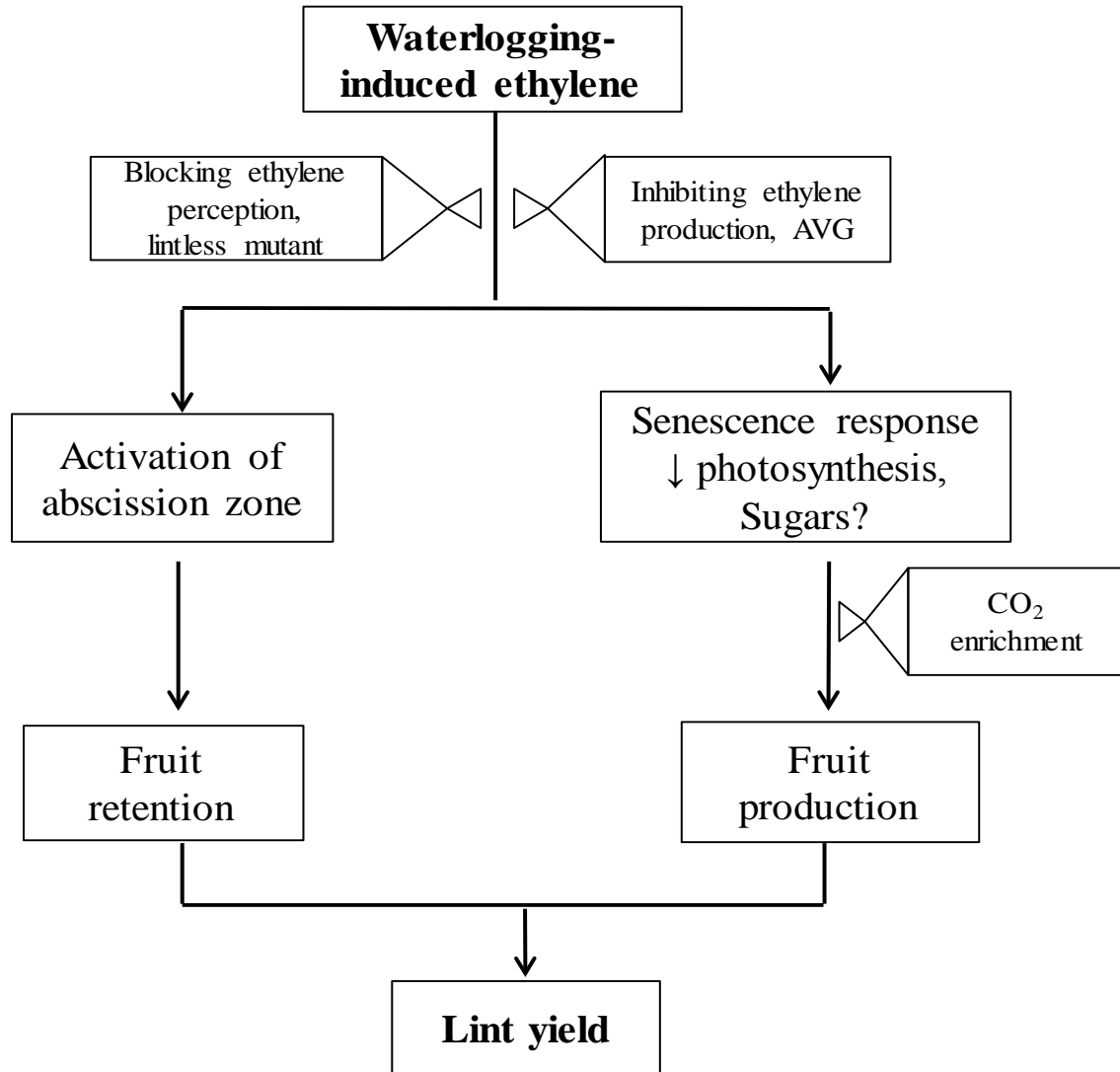


Fig. S1. Potential pathways of ethylene-induced damage to cotton yield, and remediation techniques.

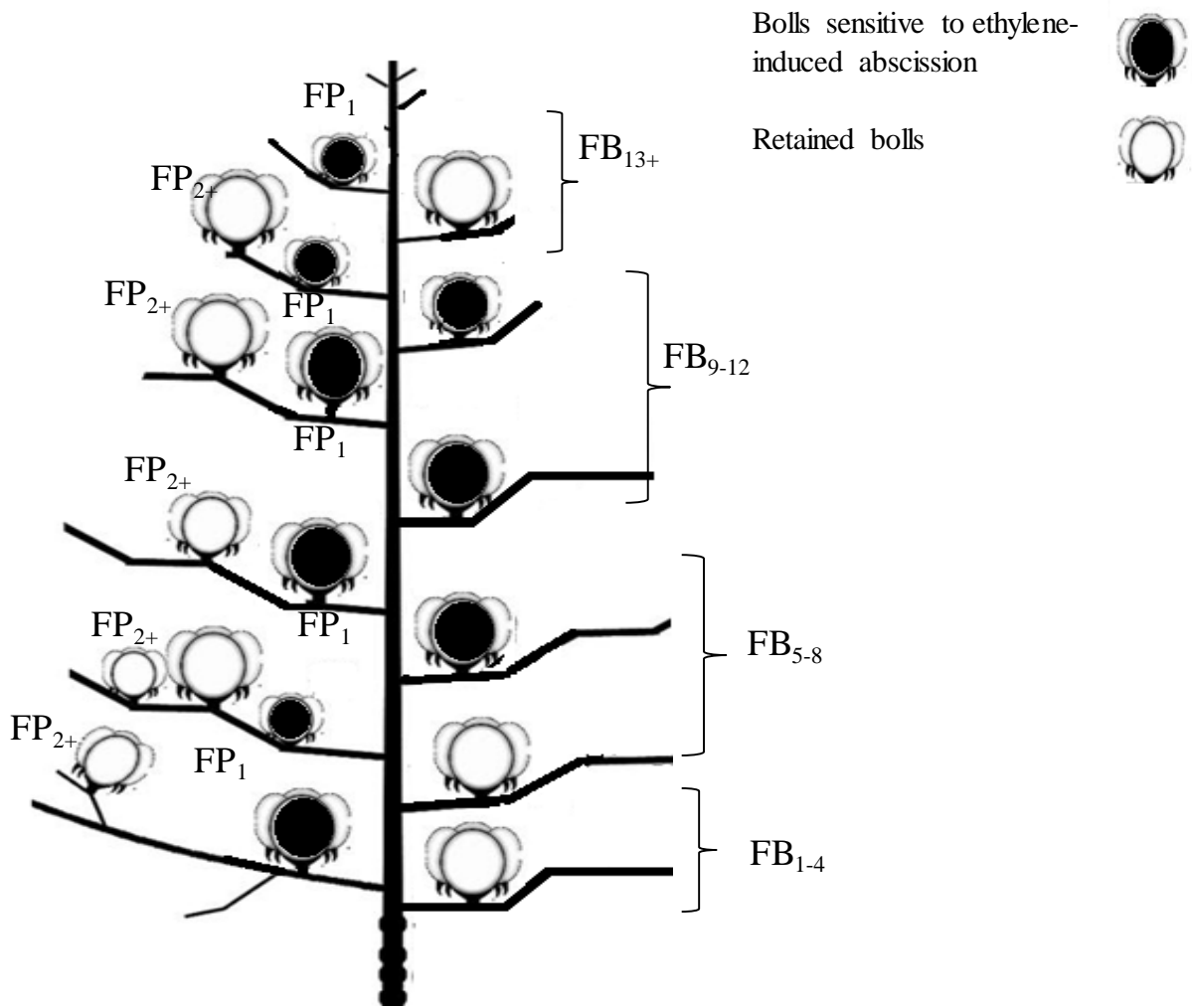


Fig. S2. Diagram outlining various fruiting branches (FB, right side) and fruiting positions (FP, left side) on the main stem assigned to the cotton plants in this study.

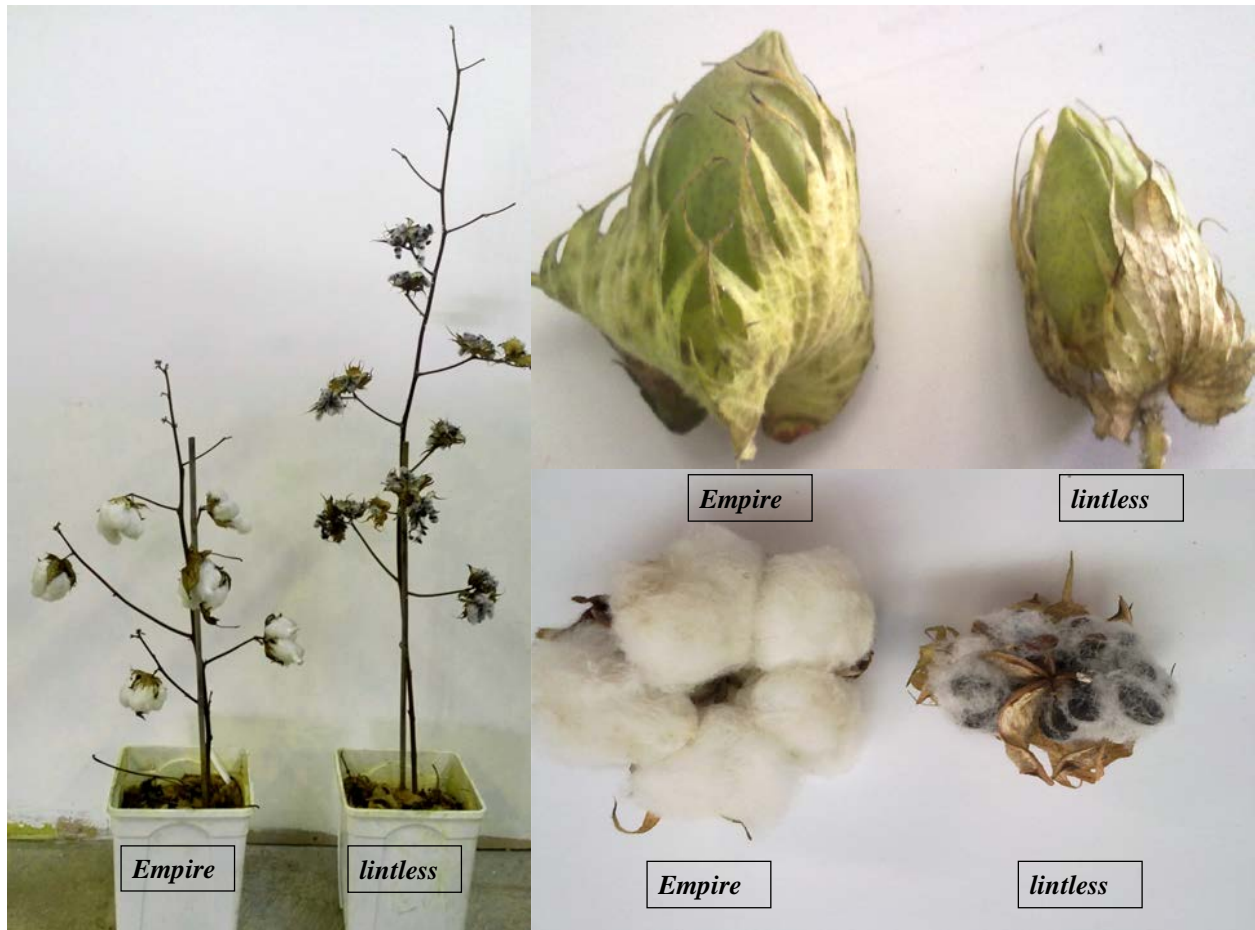


Fig. S3. Variations in shoot growth, fruit and lint production in *lintless* and *Empire*.

Table S1. Experimental layout

56–81 days after sowing		64 days after sowing	66–74 days after sowing
Main plot		Subplot	Sub-sub plot
<i>Empire</i> cultivar	400 ppm CO ₂	AVG-treated	Non-waterlogged
			Waterlogged
		Non-AVG treated	Non-waterlogged
			Waterlogged
	700 ppm CO ₂	AVG-treated	Non-waterlogged
			Waterlogged
		Non-AVG treated	Non-waterlogged
			Waterlogged
<i>Lintless</i> mutant	400 ppm CO ₂	AVG-treated	Non-waterlogged
			Waterlogged
		Non-AVG treated	Non-waterlogged
			Waterlogged
	700 ppm CO ₂	AVG-treated	Non-waterlogged
			Waterlogged
		Non-AVG treated	Non-waterlogged
			Waterlogged

Table S2. Data presented in the table summarise the main and interaction effects (*P*-values) of waterlogging, AVG and elevated CO₂ on ethylene production from various tissues of lintless and Empire cotton and total number fruits

Fruit numbers were counted one day (post-WL, 75 *DAS*) and 7 days after termination of waterlogging (post-recovery, 81 *DAS*). Ethylene concentrations from different plant tissues were measured at post-WL

Main and interactive factors	Ethylene production from cotton tissues			Total number of fruits	
	Flowers	Squares	Leaves	Post-WL	Post-recovery
Genotype	<.0001	0.0001	0.114	0.014	<.0001
Waterlogging	0.042	<.0001	<.0001	<.0001	0.0001
CO ₂	<.0001	0.926	0.891	0.021	<.0001
AVG	0.254	<.0001	0.001	0.062	0.043
Genotype×Waterlogging	0.559	0.118	0.495	0.045	0.493
Genotype×CO ₂	0.062	0.033	0.310	0.310	0.011
Waterlogging×CO ₂	0.011	0.054	0.409	0.409	0.021
Genotype×Waterlogging×CO ₂	0.068	0.045	0.173	0.173	0.019
Genotype×AVG	0.176	0.069	0.122	0.003	0.021
Waterlogging×AVG	0.696	<.0001	0.004	0.154	0.046
Genotype×Waterlogging×AVG	0.437	0.110	0.094	0.094	0.903
CO ₂ ×AVG	0.382	0.361	0.089	0.089	0.397
Genotype×CO ₂ ×AVG	0.028	0.443	0.129	0.129	0.036
Waterlogging×CO ₂ ×AVG	0.77	0.182	0.647	0.647	0.599
Genotype×Waterlogging×CO ₂ ×AVG	0.382	0.034	0.391	0.391	0.443

Table S3. Data presented in the table summarise the main and interaction effects (*P*-values) of waterlogging, AVG and elevated CO₂ on dry biomass and fruit retention of lintless and Empire cotton

Data were collected 7 days after termination of waterlogging (81 *DAS*); *DW* = dry weight (g plant⁻¹), *TDM* = total shoot dry weight (g plant⁻¹), *TSS* =total soluble sugar

Factors	Leaf <i>DW</i>	Stem <i>DW</i>	Fruit <i>DW</i>	<i>TDM</i>	Reproductive allocation	Number of nodes	Fruit retention	<i>TSS</i>
Genotype	<.0001	0.001	0.089	0.414	0.128	0.0002	0.030	0.085
Waterlogging	0.519	0.851	0.009	0.004	0.0167	0.123	0.043	0.223
CO ₂	<.0001	<.0001	0.001	<.0001	<.0001	<.0001	0.010	0.026
AVG	0.181	0.714	0.084	0.316	0.0064	0.253	0.002	0.003
Genotype×Waterlogging	0.875	0.743	0.042	0.083	0.0402	0.042	0.049	0.045
Genotype×CO ₂	0.863	0.020	0.688	0.138	0.1449	0.574	0.104	0.310
Waterlogging×CO ₂	0.710	0.312	0.0002	0.045	0.0167	0.454	0.084	0.059
Genotype×Waterlogging×CO ₂	0.009	0.532	0.293	0.074	0.2684	0.849	0.667	0.617
Genotype×AVG	0.035	0.306	0.879	0.110	0.0053	0.043	0.023	0.001
Waterlogging×AVG	0.590	0.349	0.036	0.069	0.7899	0.707	0.122	0.906
Genotype×Waterlogging×AVG	0.088	0.780	0.093	0.072	0.8243	0.454	0.148	0.107
CO ₂ ×AVG	0.067	0.059	0.225	0.638	0.1742	0.495	0.035	0.468
Genotype×CO ₂ ×AVG	0.278	0.675	0.875	0.869	0.9015	0.864	0.072	0.394
Waterlogging×CO ₂ ×AVG	0.585	0.083	0.806	0.237	0.2112	0.864	0.092	0.053
Genotype×Waterlogging×CO ₂ ×AVG	0.031	0.459	0.605	0.343	0.0303	0.307	0.954	0.913