Effect on cotton cultivars (*Gossypium hirsutum L. cv. Texas Marker (TM)-1, DeltaPine Land (DP)1522 B2XF, Phytogen (PHY)496W3R, Stoneville(ST)4747GLB)*

1. The net impact of individual and combined stress on plant growth

Crop: Cotton (*Gossypium hirsutum* cv. Texas Marker (TM)-1, Delta Pine Land (DP)1522 B2XF, PhytoGen (PHY)496W3R, Stoneville (ST)4747GLB2)
Stress 1: *Low temperature Day/night (20/12 °C)*
Stress 2: *UV-B irradiation (10 kJ m–2 d–1)*
Stage of plant: 6 day old seedling

The table shows the effect of low temperature and UV radiation in combination on growth of cotton plants.

	Treatment	Plant response to stress (reduction over control %) Type A parameters*					Response to combined stress (reduction over control %) Type B parameters*
		Plant height	Phenolics	Total dry weight	Root length	Number of root tips	
TM1	*Low temperature (20/12°C)*	15.8↓	77.5↓	76.5↓	44.8↓	13.1↓	-10.7↑
	UV-B irradiation (10 kJ m–2 d–1)	5.3↓	17.6↓	5.9↓	5.5↓	-4.1↑	-26.5↑
	Low temperature (20/12°C) + UV-B irradiation ((10 kJ m–2 d–1) (Simultaneous stress)	10.5↓	84.0↓	82.4↓	55.7↓	39.7↓	-42.3↑
B2XF	*Low temperature (20/12°C)*	18.2↓	76.7↓	76.5↓	38.9↓	24.1↓	-3.0↑

	UV-B irradiation (10 kJ m–2 d–1)	4.5↓	4.0↓	11.8↓	0.0	13.1↓	-17.8↑
	Low temperature (20/12°C) + UV-B irradiation ((10 kJ m–2 d–1) (Simultaneous stress)	9.1↓	81.3↓	82.4↓	53.2↓	60.4↓	-19.1↑
PHY496 W3R	*Low temperature (20/12°C)*	17.4↓	74.3↓	73.3↓	42.4↓	28.9↓	-44.0↑
	UV-B irradiation (10 kJ m–2 d–1)	0.0	6.9↓	0.0	1.1↓	41.9↓	-38.3↑
	Low temperature (20/12°C) + UV-B irradiation ((10 kJ m–2 d–1) (Simultaneous stress)	8.7↓	81.1↓	73.3↓	66.1↓	75.1↓	-55.4↑
ST4747 GLB2	*Low temperature (20/12°C)*	4.8↓	76.0↓	75.0↓	50.2↓	40.9↓	-6.7↑
	UV-B irradiation (10 kJ m–2 d–1)	0.0	3.1↓	0.0	1.5↓	40.9↓	-30.4↑
	Low temperature (20/12°C) + UV-B irradiation ((10 kJ m–2 d–1) (Simultaneous stress)	0.0	80.4↓	75.0↓	61.6↓	70.8↓	-30.8↑

For raw data – Click here (.xlsx file)
Reference – Brand D, Wijewardana C, Gao W, Reddy KR (2016) Interactive effects of carbon dioxide, low temperature, and ultraviolet-B radiation on cotton seedling root and shoot morphology and growth. Front.

Note: *Values presented in the table were calculated using the formula described below.*

$$\textit{Reduction over control (\%)} = \frac{(\textit{Value}_{\textit{Control}} - \textit{Value}_{\textit{Stress}})}{\textit{Value}_{\textit{Control}}} \; x100$$

1) '↓'- indicates plant parameters affected by stress that lead to high susceptibility (higher the value more the damage).
2) '↑ '- indicates plant parameters less/not affected by stress leading to improved resistance (higher the value lesser the damage).

3) "0.0" value indicates plant parameter behaved similarly under control and stress condition (no damage).

'' - For more information on parameters classification, please refer to 'methodology' tab.*

Inference from the study: Brand et.al. (2016) studied the interaction of low temperature and UV-B irradiation in four cotton cultivars Texas Marker (TM)-1, Delta Pine Land (DP)1522 B2XF, PhytoGen (PHY)496W3R, Stoneville (ST)4747GLB2). Stress treatment was given singly and simultaneously. Plant growth parameters such as leaf area, total dry weight, root length, and the number of root tips were reduced under combined stress in all cultivars. Height of plant however did not show an additive reduction under combined stress. Phenolic levels were increased under combined stress. This increase was least in cultivar DP1522. **Thus, this stress combination is detrimental to plant growth in all cotton cultivars studied.**

Reference: academic.hep.com.cn