Effect on barley genotypes

The net impact of individual and combined stress on plant growth of barley cv. Franklin and Schooner

Plant- Barley
Stress 1- Drought
Stress 2- Heat

Table showing the effect of individual and combined stress on yield attributing traits

Parameters studied	Cultivars	Plant response to stress (reduction over control %)				Parameter type *
		Heat stress (40 ºC for five days)	Heat stress (40 ºC for ten days)	Drought stress (No watering for five days)	Combined stress (Heat + drought)	
Grain yield	Franklin	10.43 ↓	15.95 ↓	18.14 ↓	41.30↓	Type A
	Schooner	2.45 ↓	2.48 ↓	20.95↓	43.28 ↓	
Grain number plant^{-1}	Franklin	3.34 ↓	1.70↓	-1.29 ↑	7.60 ↓	
	Schooner	0.29 ↓	-1.02↑	2.82 ↓	11.98 ↓	
Individual grain weight	Franklin	8.61 ↓	13.54 ↓	19.79 ↓	33.56 ↓	
	Schooner	4.09 ↓	5.47 ↓	18.62 ↓	37.06 ↓	
Mature grain weight	Franklin	6.18 ↓	22.88 ↓	19.68 ↓	27.46 ↓	
	Schooner	3.47 ↓	4.49 ↓	20.20↓	35.71 ↓	
Duration of grain filling	Franklin	0.00	12.50 ↓	25.00 ↓	25.00 ↓	
	Schooner	33.33 ↓	33.33 ↓	15.56 ↓	33.33 ↓	
The rate of grain growth	Franklin	8.51 ↓	11.35↓	12.06 ↓	17.73 ↓	
	Schooner	0	-3.65↑	1.46 ↓	15.33 ↓	

For raw data – Click here (.xlsx file)
For genotype study- Click here (.pdf file)
Reference- Savin and Nicolas, 1996

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) '0'- indicates plant was not affected by stress.
2) '↓'- indicates plant parameters affected by stress that leads to high susceptibility.
3) '↑'- indicates plant parameters less/not affected by stress leading to improved resistance.
4) Control plants maintained at soil water content of 50% FC and 21/17 ºC day/night temperature.
'' - For more information on parameters classification, please refer to 'methodology' tab.*

The inference from the study: Savin and Nicolas, 1996 study mainly focused on understanding the effect of combined high temperature (40 C for 5-10 days) and drought (for ten days) on grain filling period and yield in two barley cv. Franklin and Schooner. Results showed a reduction in grain yield, grain number, individual grain weight, mature grain weight, duration of grain filling period and grain growth rate in both individual and combined stress in

both the cultivars. Among the stresses, drought resulted in higher yield reduction compared to heat stress, but the overall impact of combined stress on yield was more compared individual stresses. Franklin showed higher sensitivity to heat stress whereas, Schooner showed higher sensitivity to drought stress. Schooner showed a higher reduction in mature grain weight under combined stress and high temperature and was due to a reduction in the duration of grain filling whereas in Franklin was due to a reduction in both duration of grain filling and rate. **Overall results indicated that drought, when combined with high temperature, causes higher yield losses in barley cv. Franklin and Schooner under field condition.**