

Effect on maize (*Zea mays*) cultivars

The net impact of individual and combined stress on plant growth

The table shows the effect of individual and combined drought and freezing stress on the physiology of maize cv Z7 and Penjalinan

Plant: Maize (*Zea mays*) cultivar Z7 and Penjalinan
Stress 1: Drought treatment (hardening) was given by keeping plants out of the solution (Hoagland) at time intervals (2, 4, 6, 8 and 10h on first, second, third, fourth and fifth day, respectively) for 5 days.
Stress 2: 5°C day/night for 5 days.
Stage of the plant: Seedling

| Cultivars | Stress treatments | Plant response to stress (percent reduction over control) | | | | | |
|------------|-------------------|---|-----------------|------------------------|-----------------------|-----------------------------|----------------------------|
| | | Type A parameters * | | Type B parameters* | | | Type C parameter* |
| | | Relative growth rate | Leaf area ratio | Relative water content | Net assimilation rate | Specific transpiration rate | Leaf ABA content (ng/g) ** |
| Z7 | Chilling | 68.1 ↓ | 22.73 ↓ | 10.6 ↓ | 59.5 ↓ | -31.6 ↑ | 661.4 |
| | Drought+Chilling | 54.2 ↓ | 4.5 ↓ | 11.1 ↓ | 52.4 ↓ | 28.9 ↓ | 1473.9 |
| Penjalinan | Chilling | 70.9 ↓ | 12.5 ↓ | 37.9 ↓ | 66.7 ↓ | -31.4 ↑ | 1401 |
| | Drought+Chilling | 31.4 ↓ | 8.3 ↓ | 13.5 ↓ | 25 ↓ | -8.6 ↑ | 2619.8 |

Control(absolute)- Leaf ABA content-270.8 (Z7) and 296(Penjalinan).

For raw data – Click here (.xlsx file)

Reference- Javier PJ, José II, Manuel S-D. (1997) Chilling of drought-hardened and non-hardened plants of different chilling-sensitive maize lines Changes in water relations and ABA contents. *Plant Science* 122(1): 71-79.

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

$$\text{Reduction over control (\%)} = \frac{(\text{Value Control} - \text{Value Stress})}{\text{Value Control}} \times 100$$

1) '↓'- indicates plant parameters affected by stress that lead to high susceptibility (higher the value more the damage).

2) '↑'- indicates plant parameters affected by stress that lead to reduced susceptibility (higher the value less the damage).

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

** - Values are presented as it is from the source article without subjecting to the calculation.

The inference from the study: Javier et al., 1997 reported that chilling caused more reductions in relative growth rates, photosynthesis and transpiration rate in maize cv Z7 and Penjalinan. The reductions in RWC and net assimilation rates were found to be more in Penjalinan as compared to Z7. **Thus, it can be concluded that combined drought and chilling was less damaging than the individual chilling stress.**