

Effect on grapevine cultivars

Cultivars used for the study- Malvasia de Banyalbufar and Giro-Ros

Drought- was given based on daily stomatal conductance (gs). Control -gs>200 mol.m⁻².s⁻¹; Moderate stress- gs<100 mol.m⁻².s⁻¹.

Virus- Inoculum is described in source article.

Table showing net impact of combined stress over drought stress

	gs	A _N	V _{max}	J _{max}	gm	TSP	Rub/TSP	Chltotal	Cartot	T _L	M _A	D _L	Spongy	Palisade	f _{ias} %
Malvasia															
Combined stress	47.37	29.20	23.30	32.12	23.08	17.70	-46.15	-19.05	-15.00	10.65	8.24	-14.29	10.14	24.01	27.78
Virus stress	31.58	31.29	19.65	20.26	46.15	20.43	-23.08	33.33	25.00	-23.49	-30.71	-8.57	-40.09	-10.65	10.19
Drought stress	52.63	24.15	1.38	14.17	15.38	0.19	-76.92	0.00	17.50	-3.26	-0.37	0.00	-14.20	10.17	34.72
Giro-Ros															
Combined stress	65.22	49.25	27.16	27.36	44.00	7.80	16.67	-75.00	-65.79	6.02	39.25	-12.50	27.68	23.05	49.54
Virus stress	-4.35	11.31	27.92	14.60	32.00	13.98	5.56	12.50	7.89	-4.75	4.21	8.33	-5.01	-2.35	22.15
Drought stress	60.87	37.93	13.05	22.86	48.00	2.42	-5.56	-50.00	-42.11	-6.39	24.39	29.17	-9.70	-17.47	26.46

gs- stomatal conductance; *A_N*- net photosynthetic rates; *V_{max}*- maximum carboxylation rate; *J_{max}*- maximum photosynthetic electron transport rate; *gm-* mesophyll conductance; *TSP-* total soluble proteins; *Rub/TSP-* Rubisco concentration/TSP; *Chltotal-* total chlorophyll; *Cartot-* total carotenoid content; *T_L*- leaf thickness; *M_A*- leaf mass per area; *D_L*- leaf density; thickness of mesophyll layers (Spongy and Palisade); *f_{ias} %*- mesophyll porosity.

Reference- Hanan et al., 2016

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

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

- 1) '0'- indicates plant was not affected by stress as depicted by the parameter.
- 2) '1 or 100 '- indicates plant parameters affected under stress that lead to high susceptibility (higher the value more the damage).
- 3) '-1 to -100'-indicates plant parameters less/not affected under stress leading to improved resistance (higher the value lesser the damage)

Inference from the study: Results from Hanan et al. (2016), showed that grapevine cultivars subjected to individual *Grapevine leafroll-associated virus 3* (GLRaV-3) infection changed physiological and anatomical parameters in both cultivars, Malvasia being more affected as compared to Giro-Ros under well-watered conditions. However, no effect of GLRaV-3 infection was seen when subjected to combined stress. This clearly indicates that water potential of leaf tissue influences GLRaV-3 pathogenicity. **Overall, the observed differences between cultivars can be attributed to their genetic variability and GLRaV-3 concentration (in the plant) under both control and drought stressed condition.**