Predicting stomatal responses to the environment from the optimization of photosynthetic gain and hydraulic cost

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SUPPORTING INFORMATION

Figure S1. Shifts of the cost (θ, blue), gain (β, green) and optimization (β-θ, black) functions in relation to changes in **(a)** vapor pressure deficit (D, kPa), **(b)** air temperature (T_A, °C), **(c)** atmospheric CO_2 concentrations (C_a, Pa), **(d)** maximum carboxylation rate (V_{max25}, µmol s^{-1} m^{-2}), **(e)** soil water potential (P_s, -MPa), and **(f)** soil-canopy vulnerability curves (Weibull parameters [b,c]). Three representative values have been plotted in each panel. All parameters are set to the default value (Table 1) except for the tested variable. For the V_{max25} response, k_{max} and G_{max} were held constant at their optima for V_{max25} = 100 µmol $s^{-1}m^{-2}$.

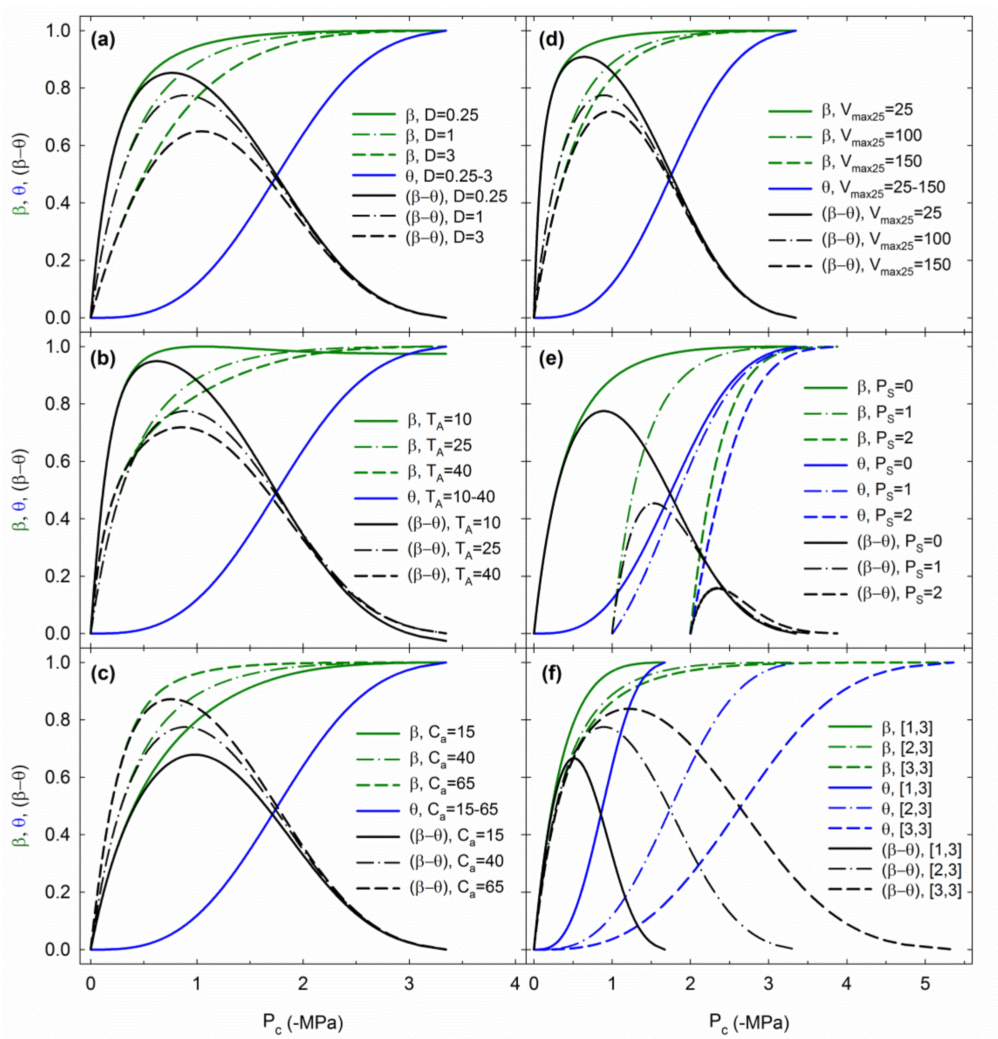

Figure S2. Differences between optimum stomatal control between a sigmoid and an exponential soil-canopy vulnerability curve (Weibull [2,3] and [2,1], respectively) for two soil water potentials, **(a)** P_s=0 and **(b)** P_s=-2 MPa. The gain (β, green), cost (θ, blue) and optimization (β-θ, black) functions of the sigmoid (solid) and exponential (dashed) vulnerability curves produce a different optimum (solid arrow, sigmoid; dashed arrow; exponential). The red arrow indicates how the exponential vulnerability curve closes stomata under wet soil conditions (a) compared to the sigmoid and opens them under dryer soils (b).