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Supplementary Material

Osmotic adjustment of young sugar beets (*Beta vulgaris* L.) under progressive drought stress and subsequent rewatering assessed by metabolite analysis and infrared thermography

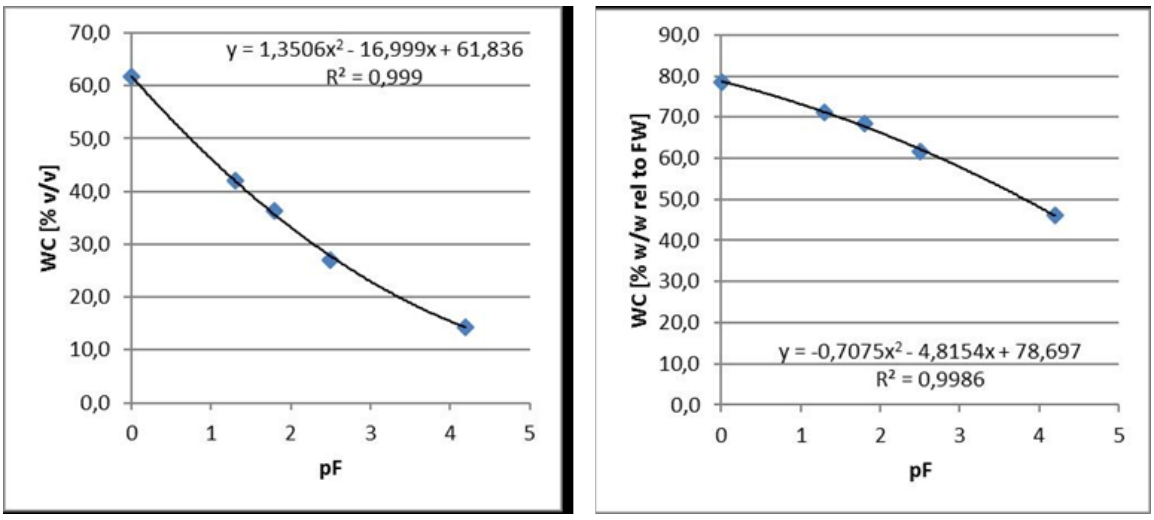
Rita Wedeking[A,C], Anne-Katrin Mahlein[B], Ulrike Steiner[B], Erich-Christian Oerke[B], Heiner E. Goldbach[A] and Monika A. Wimmer[A,D]

[A]Department of Plant Nutrition, Institute of Crop Science and Resource Conservation (INRES), University of Bonn, Bonn, Karlrobert-Kreiten-Str. 13, 53115 Bonn, Germany.

[B]Department of Phytomedicine, Institute of Crop Science and Resource Conservation (INRES), University of Bonn, Meckenheimer Allee 166a, 53115 Bonn, Germany.

[C]Environmental Safety-Metabolism, Bayer CropScience AG, Alfred-Nobel-Str. 50, 40789 Monheim, Germany.

[D]Corresponding author. Email: m.wimmer@uni-bonn.de



pF	Water content [v/v]	Water content [% w/w] relative to the FW
0.0	61.7	78.6
1.3	42.0	71.2
1.8	36.4	68.4
2.5	27.0	61.6
4.2	14.4	46.4

Fig. S1. Relationship between pF (log10 of the absolute value of the soil matrix potential, unitless) values and the substrate water content. The pF curve, or soil moisture retention curve, describes the relation between the amount of water in a soil and the force with which it is held.

Substrate used: "Gepac Anzuchterde" consisting of 70% peat, 20%, clay and 10% perlite. Bulk density: 0.169±0.008 g cm^{-3}. Total pore volume: 61.7±0.4%

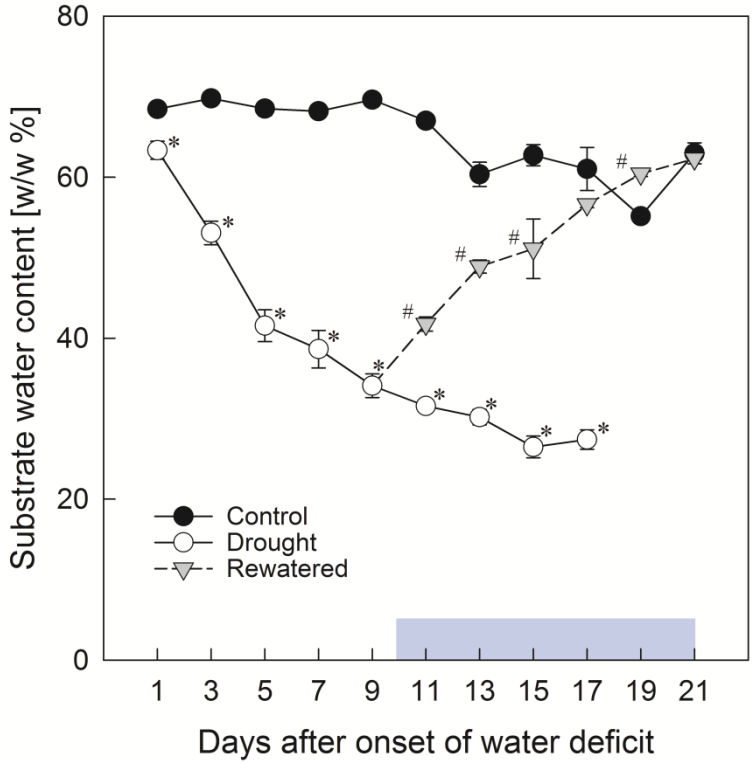


Fig. S2. Gravimetric water content (w/w, based on substrate FW) of the soil substrate mix under regular water supply (control, closed circles), progressive drought stress (open circles) and rewatering (triangles). The horizontal bar represents the recovery period. Values are means ± SE, n=4. For each harvest day, significant differences to the control plants (α=0.05) are indicated by asterisks (drought treatment) and rhombs (rewatering).

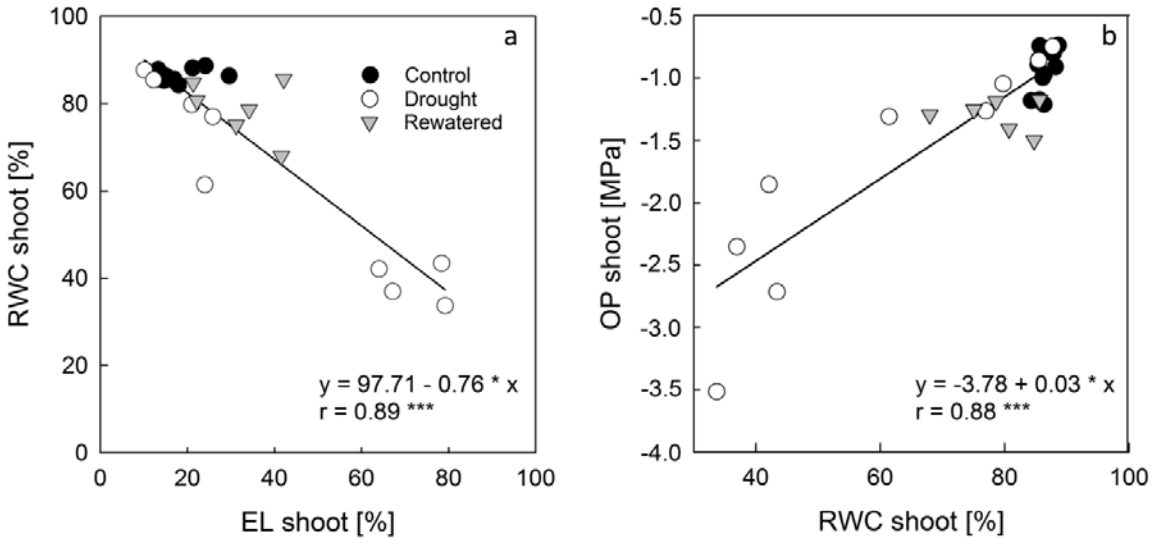


Fig. S3. Correlation between electrolyte leakage (EL) and relative water content (RWC) (A) and between RWC and osmotic potential (OP) B) of sugar beet shoots under regular water supply (closed circles), drought stress (open circles) and re-watering (triangles). Values are means ±SE (n=4).

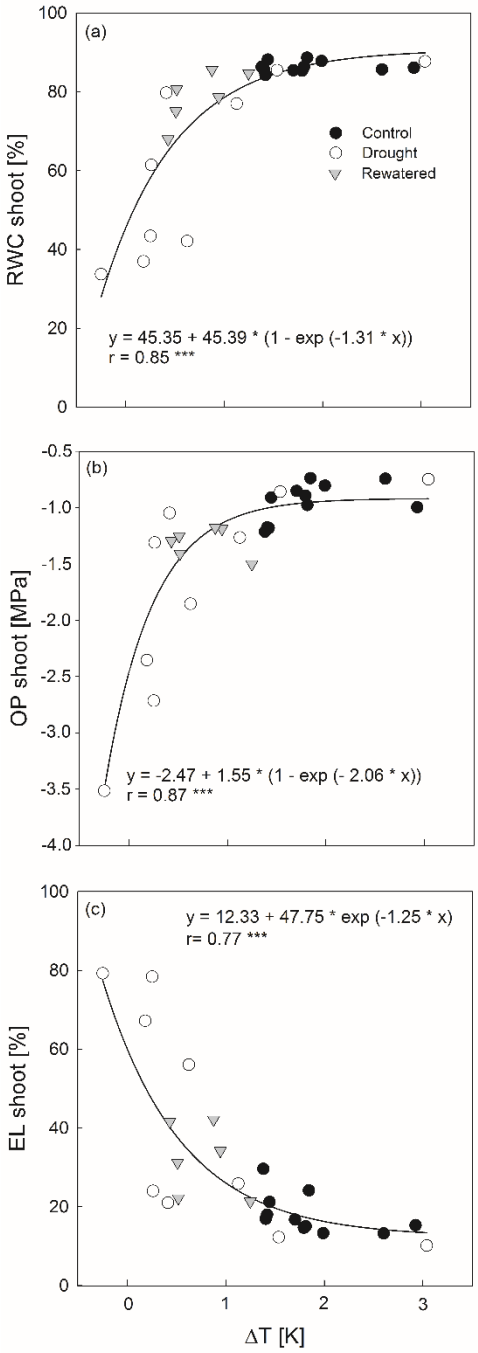


Fig. S4. Correlation analysis between the mean temperature difference between the sampled leaf and the ambient temperature (ΔT) and (*a*) the relative water content (RWC), (*b*) the osmotic potential (OP) and (*c*) the electrolyte leakage (EL) of sugar beet shoots under regular water supply (control, closed circles), drought stress (open circles) and rewatering (triangles). Values are means, n=4.

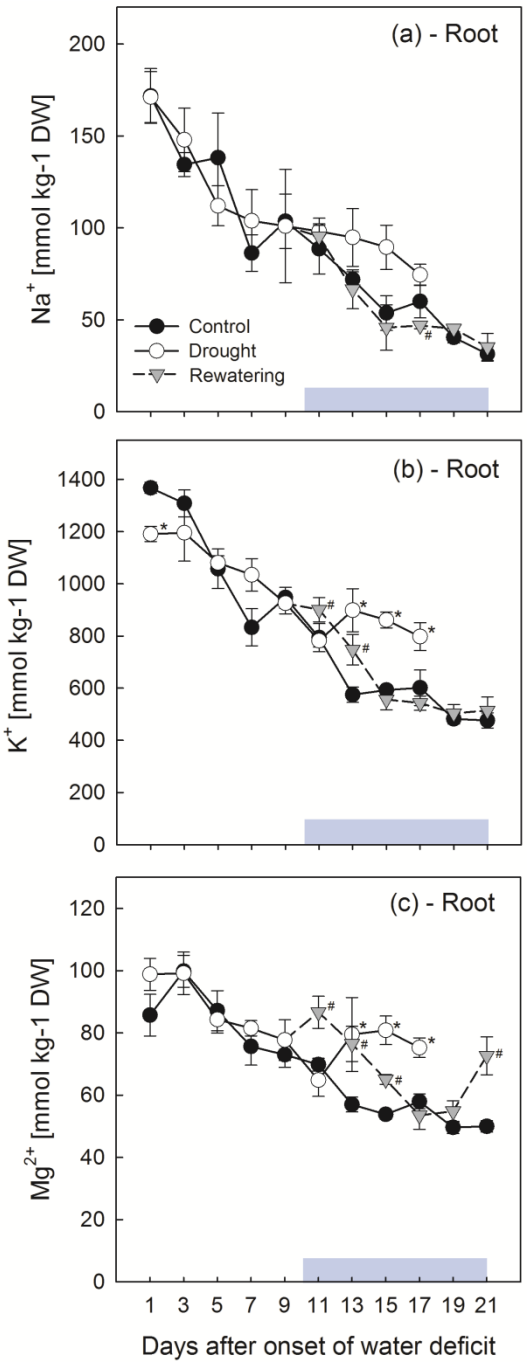


Fig. S5. Concentrations of (*a*) sodium (Na^+), (*b*) potassium (K^+), and (*c*) magnesium (Mg^{2+}) in young sugar beet roots under regular water supply (control, closed circles), drought stress (open circles) and rewatering (triangles). The horizontal bar represents the recovery period. Values are means ± SE, n=4. For each harvest day, significant differences to the control plants (α=0.05) are indicated by asterisks (drought treatment) and rhombs (rewatering).

Table S1. Contribution of ions and metabolites to the osmotic potential of sugar beet leaves and taproots; values represent means of all days (1-17) of either control or drought stressed plants.

SHOOT		mean	se	**ROOT**		mean	se
Control	K	39.2	1.4	Control	K	12.9	0.8
	Na	14.4	0.6		Na	1.4	0.1
	Mg	15.2	0.9		Mg	1.1	0.0
	ions tot	**68.3**	**1.8**		**ions tot**	**15.4**	**1.0**
	Proline	1.0	0.1		Proline	0.2	0.1
	Glutamate	2.4	0.3		Glutamate	0.4	0.0
	Malate	1.1	0.2		Malate	0.1	0.0
	Glucose	0.6	0.1		Glucose	0.1	0.0
	Fructose	0.6	0.1		Fructose	0.2	0.0
	Sucrose	0.3	0.0		Sucrose	22.4	2.1
	metabolites tot	**6.0**	**0.7**		**metabolites tot**	**23.3**	**2.1**
stress	Na	17.6	1.1	stress	Na	1.5	0.2
	K	43.7	1.7		K	3.7	2.0
	Mg	15.6	1.7		Mg	1.1	0.1
	ions tot	**76.9**	**3.9**		**ions tot**	**16.1**	**1.9**
	Proline	1.9	0.4		Proline	0.1	0.0
	Glutamate	1.6	0.1		Glutamate	0.4	0.1
	Malate	0.9	0.2		Malate	0.3	0.1
	Glucose	0.4	0.1		Glucose	0.2	0.1
	Fructose	0.5	0.1		Fructose	0.2	0.0
	Sucrose	0.4	0.0		Sucrose	19.2	3.8
	metabolites tot	**5.7**	**0.7**		**metabolites tot**	**20.4**	**4.1**