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Morphological and physiological traits that explain yield response to drought stress in miscanthus

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Supplementary Table S1

Genotypes used in the experiment with information on species, country of origin and ploidy. *M. × giganteus* a commercial triploid hybrid between *M. sacchariflorus* and *M. sinensis*

WT code	species	country	ploidy
WAT03	<i>M. sacchariflorus</i>	Japan	4
WAT04	<i>M. sacchariflorus</i> (cv. Robustus)	China	2
WAT09	<i>M. × giganteus</i>	Japan	3
WAT10	<i>M. sinensis</i>	unkn.	unkn.
WAT11	<i>M. sinensis</i> (cv. Goliath)	Japan	3

Supplementary Table S2

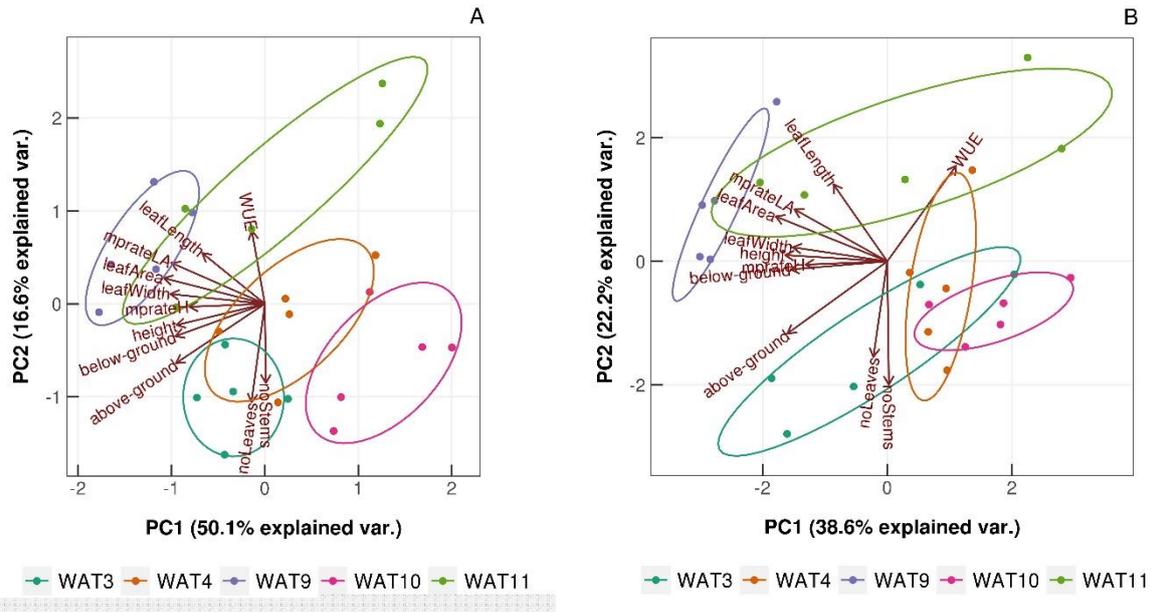
Drought resistance indices were calculated using the following relationships

$$\begin{aligned} \text{SSI} &= 1 - (Y_s/Y_p) / 1 - (\bar{Y}_s/\bar{Y}_p) \\ \text{STI} &= (Y_p + Y_s) / \bar{Y}_p^2 \\ \text{MP} &= (Y_p + Y_s) / 2 \\ \text{TOL} &= Y_p - Y_s \end{aligned}$$

Where Y_s yield under stress, Y_p is the yields under irrigated condition \bar{Y}_s and \bar{Y}_p are the mean yields of all cultivars under stress and control conditions, respectively.

Supplementary Figure S1

Principal component analysis (PCA) of morphology and biomass characteristics measured at harvests, of control (A) and plants under moderate drought stress (B); The overlapped variable names on the plot B are height, mprateH, and below-ground; The abbreviations used: WUE, water-use efficiency; below-ground, dry weight of below-ground biomass; above-ground, dry weight of above-ground biomass; height, the height of the main stem; noStems, averaged number of stem per plant; leafLength, the length of the youngest fully expanded leaf with ligule; leafWidth, the width of the youngest fully expanded leaf with ligule of the main stem; noLeaves, the number of leaves on the main stem; leafArea, area of the youngest fully leaf of the main stem; mprateLA, mean progression rate of the leaf area; mprateH, mean progression rate of the main stem.



Supplementary Table S3

Analysis of variance on effects of drought stress (DS) treatment on the net transpiration rate (E), and net CO₂ assimilation (AN) of miscanthus genotypes, SE – measure of the uncertainty in the coefficient; t value is derived from the t-statistic and P-value indicates the statistical significance for a given term within the model. Significance of differences are shown as .P ≤ 0.1; *P ≤ 0.05; **P ≤ 0.01; ***P ≤ 0.001; ns = not significant.

Genotype	Source of variation	net CO ₂ assimilation				net transpiration rate			
		Coefficient ± SE	t-val	P	Coefficient ± SE	t-val	P		
WAT03	(Intercept)	21,94 ± 2,98	7,34	ns	1,39 ± 0,26	5,18	ns		
	treatmentDS	4,88 ± 4,22	1,15	ns	0,61 ± 0,38	1,6	ns		
	TimePoint	-1,14 ± 1,42	-0,80	*	0,26 ± 0,12	2,04	ns		
	treatmentDS:TimePoint	-1,80 ± 2,01	-0,89	ns	-0,27 ± 0,18	-1,5	ns		
WAT04	(Intercept)	23,75 ± 4,17	5,68		1,34 ± 0,41	3,21	ns		
	treatmentDS	4,19 ± 5,86	0,71	**	0,70 ± 0,58	1,19	**		
	TimePoint	0,13 ± 1,74	0,08	.	0,41 ± 0,16	2,59	ns		
	treatmentDS:TimePoint	-4,59 ± 2,41	-1,90	.	-0,56 ± 0,22	-2,5	*		
WAT09	(Intercept)	27,32 ± 2,63	10,35	ns	1,83 ± 0,35	5,22	ns		
	treatmentDS	-0,80 ± 3,73	-0,21	***	-0,10 ± 0,49	-0,2	**		
	TimePoint	-1,64 ± 1,26	-1,29	**	0,22 ± 0,18	1,2	ns		
	treatmentDS:TimePoint	-2,18 ± 1,79	-1,22	ns	-0,22 ± 0,25	-0,9	ns		
WAT10	(Intercept)	34,13 ± 2,90	11,75	ns	2,92 ± 0,41	7,09	ns		
	treatmentDS	-5,47 ± 4,10	-1,33	ns	-0,78 ± 0,58	-1,3	ns		

	TimePoint	-7,10 ± 1,51	-4,68	***	-0,39 ± 0,18	-2,1	.
	treatmentDS:TimePoint	2,42 ± 2,14	1,12	ns	0,34 ± 0,26	1,29	ns
WAT11	(Intercept)	15,36 ± 3,09	4,95	ns	1,19 ± 0,24	4,91	ns
	treatmentDS	2,19 ± 4,29	0,51	.	0,14 ± 0,33	0,43	ns
	TimePoint	-1,58 ± 1,61	-0,98	**	0,05 ± 0,13	0,41	ns
	treatmentDS:TimePoint	-2,41 ± 2,19	-1,10		-0,18 ± 0,18	-1	

Supplementary Table S4

The mean values of water use efficiency and cumulative water use for each genotype under both treatments and the analysis of variance on the effect of drought stress on shoot water use efficiency (WUE), and the absolute water use compared to control; SEM – standard error of the mean; P-value indicates the statistical significance for a given term within the model. Significance of differences are shown as .P ≤ 0.1; *P ≤ 0.05; **P ≤ 0.01; ***P ≤ 0.001; ns = not significant..

	Water use efficiency (g kg ⁻¹)				Water use (kg)			
	Control	Drought	Treatment effect		Control	Drought	Treatment effect	
	Mean ±	Mean ±	Coefficient ± SE	P	Mean ±	Mean ±	Coefficient	P
WAT03	8.50 ±	12.59 ±	4.09 ± 1.03	**	9.92 ±	5.50 ±	-5.42 ± 0.76	***
WAT04	10.14 ±	16.93 ±	6.79 ± 0.74	***	6.47 ±	2.78 ±	-3.70 ± 0.86	**
WAT09	9.38 ±	13.42 ±	4.05 ± 0.71	***	8.70 ±	4.00 ±	-4.70 ± 1.02	**
WAT10	6.69 ±	15.57 ±	8.89 ± 0.92	***	7.60 ±	2.92 ±	-4.69 ± 0.75	***
WAT11	8.03 ±	17.32 ±	9.29 ± 0.65	***	7.17 ±	2.62 ±	-4.97 ± 1.42	***