

Supplementary Figures and Tables:

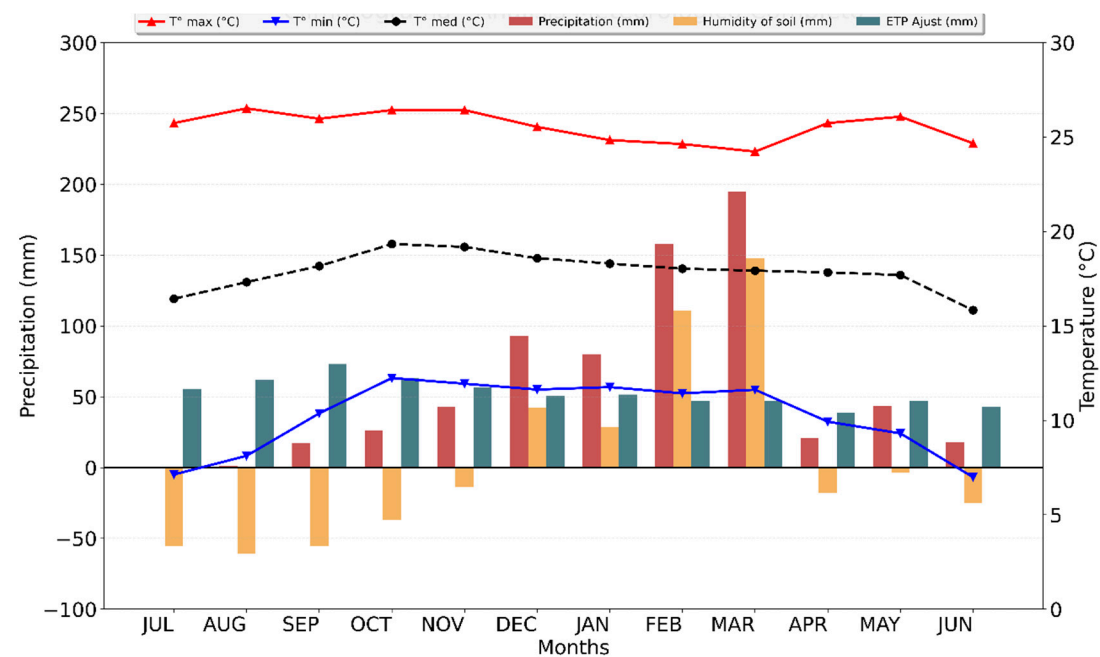


Figure S1. Climograph of the 2023–2024 agricultural campaign. Key climatic variables were recorded, including minimum temperature (T_{min} , $^{\circ}\text{C}$), maximum temperature (T_{max} , $^{\circ}\text{C}$), mean temperature (T_{med} , $^{\circ}\text{C}$), precipitation (mm), soil moisture availability (mm) and adjusted evapotranspiration (ETP Ajust, mm).

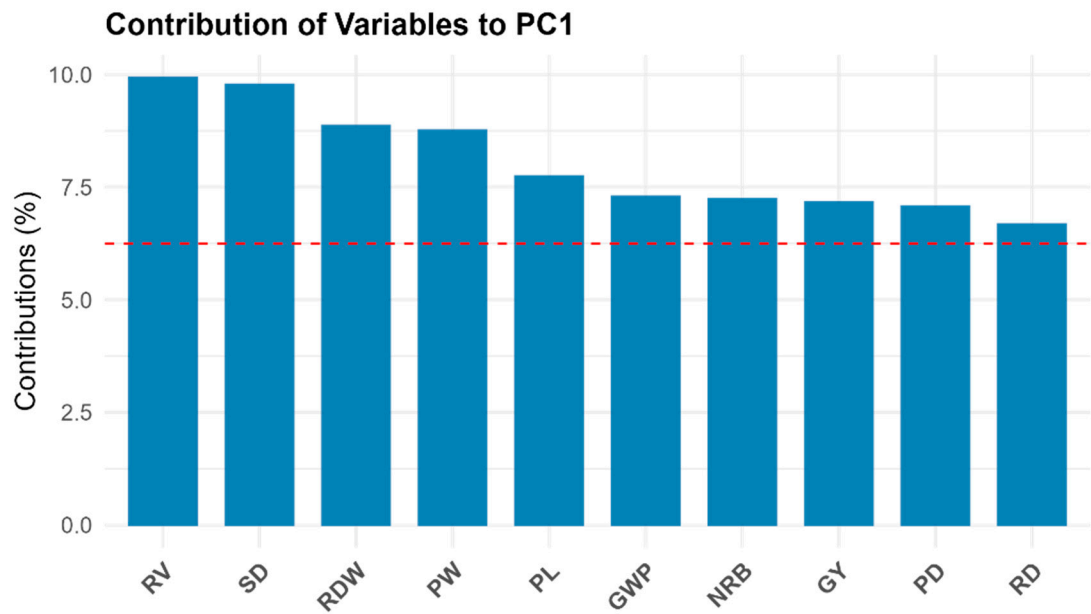


Figure S2. Contribution of vegetative, yield and root traits to the principal component analysis 1 (PCA1). The bar plot shows the relative contribution (%) of each variable to the total variance explained by the first principal components. Variables above the red dashed line represent traits with the highest influence on the multivariate differentiation among treatments.

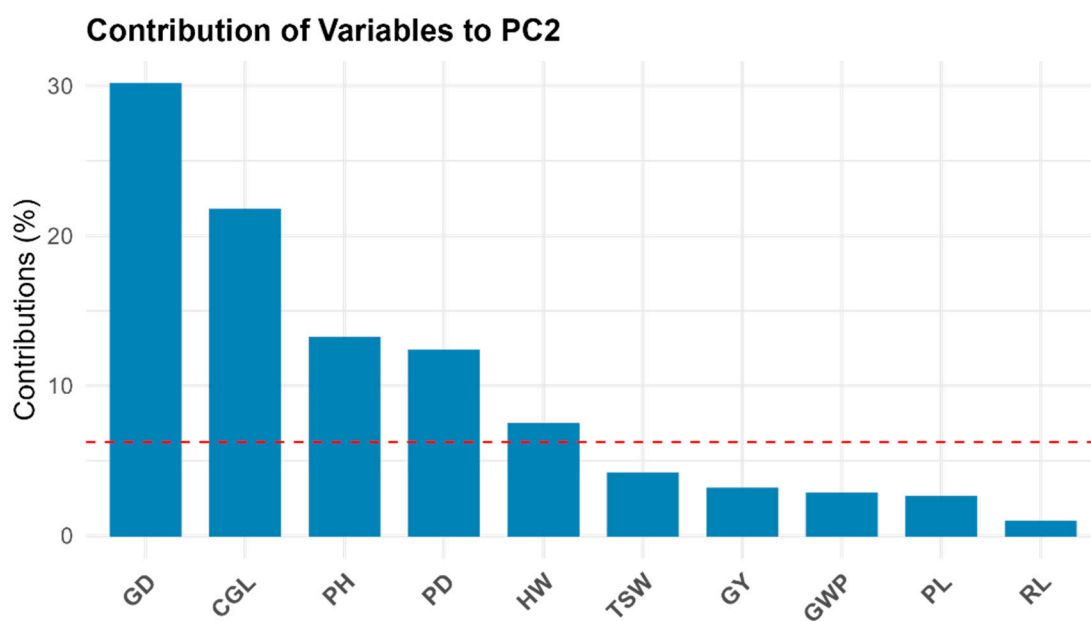


Figure S3. Contribution of vegetative, yield and root traits to the principal component analysis 2 (PCA2). The bar plot shows the relative contribution (%) of each variable to the total variance explained by the first principal components. Variables above the red dashed line represent traits with the highest influence on the multivariate differentiation among treatments.

Table S1. Analysis of variance (ANOVA) for vegetative, root and yield parameters of purple maize genotypes under different treatments

Vegetative parameters		Plant height (cm)			Stem diameter (mm)			Panicle length (cm)			Panicle diameter (cm)			Central glomerule length (mm)					
Source of variation	Df	Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)				
Treatment	3	170.00	0.16		8.09	0.000	***	629.12	0.000	***	47.124	0.000	***	32.37	0.000	***			
Genotype	3	5826.50	0.000	***	5.88	0.000	***	902.73	0.000	***	83.079	0.000	***	55.44	0.000	***			
Treatment: Genotype	9	137.60	0.211		0.57	0.65		48.54	0.69531		3.079			4.92	0.003	**			
Root parameters		Root length (cm)			Root diameter (mm)			Number branches root (unid)			Root volumen (cm ³ plant ⁻¹)			Dry weight root (g plant ⁻¹)					
Source of variation	Df	Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)				
Treatment	3	51.561	0.000	***	17.8817	0.002	**	212.36	0.000	***	55.187	0.000	***	12.16	0.000	***			
Genotype	3	29.771	0.006	**	15.0068	0.004	**	8.45	0.473		25.177	0.000	***	12.62	0.000	***			
Treatment: Genotype	9	7.78	0.274		4.2723	0.184		6.75	0.7154		3.43	0.342		2.80	0.0016	**			
Yield parameters		Panicle weight (g panicle ⁻¹)			Weight grain panicle (g panicle ⁻¹)			Thousand seed weight (g)			Grain diameter (mm)			Hectoliter weight (g hL ⁻¹)			Grain yield (t ha ⁻¹)		
Source of variation	Df	Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)		Mean Sq	Pr(>F)	
Treatment	3	910.8	0.000	***	146.105	0.000	***	1.74267	0.000	***	0.08788	0.000	***	2447.30	0.005	**	21.16	0.000	***
Genotype	3	68.7	0.411		21.305	0.038	*	0.5874	0.001	**	0.77332	0.000	***	28210.10	0.000	***	3.27	0.049	*
Treatment: Genotype	9	54.94	0.627		8.978	0.258		0.16995	0.055		0.0082	0.000	***	2994.60	0.000	***	0.98	0.55	

Table S2. Vegetative, yield and root parameters of quinoa genotypes evaluated by Tukey's test.

	BJ			NC			RP			SH		
Vegetative parameters	<i>mean ± sd</i>		Tukey	<i>mean ± sd</i>		Tukey	<i>mean ± sd</i>		Tukey	<i>mean ± sd</i>		Tukey
PH (cm)	103.00	± 3.24	a	62.50	± 2.71	b	72.10	± 3.34	b	106.00	± 2.81	a
CLG (mm)	8.57	± 0.59	b	7.98	± 0.23	bc	11.77	± 0.85	a	6.72	± 0.51	c
PL (cm)	63.40	± 2.66	a	44.8	± 2.55	b	54.40	± 1.98	a	62.50	± 4.09	a
PD (cm)	8.33	± 0.66	b	5.55	± 0.53	c	11.79	± 0.75	a	7.29	± 0.83	bc
SD (mm)	6.76	± 0.26	a	5.09	± 0.36	b	6.25	± 0.29	a	6.10	± 0.35	a
Yield Parameters	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>
PW (g)	26.90	± 3.10	a	23.40	± 3.15	a	28.10	± 3.05	a	23.40	± 3.71	a
GWP (g)	10.85	± 1.40	a	8.62	± 1.21	ab	8.25	± 1.10	ab	7.88	± 1.07	b
TSW (g)	3.07	± 0.09	a	2.64	± 0.10	b	2.59	± 0.14	b	2.65	± 0.17	b
GD (mm)	1.70	± 0.02	b	1.60	± 0.01	c	2.13	± 0.03	a	1.60	± 0.01	c
GY (t ha ⁻¹)	3.99	± 0.55	a	2.81	± 0.50	b	3.02	± 0.52	ab	3.08	± 0.44	ab
HW (g hL ⁻¹)	574.00	± 10.80	ab	483.00	± 12.70	c	595.00	± 2.41	a	558.00	± 10.00	b
Root Parameters	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>
RDW (g plant ⁻¹)	4.04	± 0.46	a	1.60	± 0.21	b	3.17	± 0.40	a	3.27	± 0.46	a
RL (cm)	20.00	± 0.37	a	16.30	± 1.28	b	18.30	± 0.64	ab	19.0	± 1.07	a
RD (mm)	7.47	± 0.35	a	5.17	± 0.35	b	7.59	± 0.92	a	6.88	± 0.49	ab
NRB	14.10	± 1.38	a	14.00	± 1.51	a	14.00	± 1.01	a	12.40	± 1.60	a
RV (cm ³ plant ⁻¹)	7.08	± 0.85	a	3.57	± 0.50	b	5.38	± 0.63	a	5.71	± 0.87	a

Table S3. Vegetative, yield, and root parameters of treatments evaluated by Dunnett's test.

	T1 (Testigo)			T2 (<i>Azospirillum</i>)			T3 (<i>Glomus iranicum</i>)			T4 (co inoculation)		
Vegetative												
Parameters	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>
PH (cm)	80.50	± 4.87	-	89.00	± 7.41	NS	87.1	± 6.11	NS	87.60	± 7.05	NS
CLG (mm)	6.58	± 0.44	-	9.14	± 0.83	****	8.77	± 0.54	***	10.50	± 0.85	****
PL (cm)	46.70	± 2.34	-	58.10	± 3.24	**	56.20	± 3.05	*	64.01	± 3.90	****
PD (cm)	5.56	± 0.78	-	8.86	± 0.72	***	8.25	± 0.96	**	10.30	± 0.86	****
SD (mm)	4.94	± 0.26	-	6.07	± 0.30	*	6.28	± 0.25	**	6.91	± 0.37	****
Yield												
Parameters	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>
PW (g)	14.10	± 1.14	-	25.50	± 1.98	**	26.80	± 2.26	**	35.30	± 3.62	****
GWP (g)	4.75	± 0.57	-	8.33	± 0.53	**	9.28	± 0.79	***	13.20	± 1.30	****
TWS (g)	2.46	± 0.12	-	2.76	± 0.08	*	2.46	± 0.09	NS	3.27	± 0.11	****
GD (mm)	1.64	± 0.06	-	1.82	± 0.08	****	1.75	± 0.05	****	1.82	± 0.06	****
GY (t ha ⁻¹)	1.71	± 0.28	-	2.98	± 0.31	*	3.27	± 0.32	**	4.94	± 0.59	****
HW (g hLl ⁻¹)	572.00	± 10.30	-	552.00	± 24.10	ns	540.00	± 10.50	**	545.00	± 13.10	*
Root Parameters	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>	<i>mean ± sd</i>		<i>Pr(>F)</i>
RDW (g plant ⁻¹)	1.80	± 0.25	-	3.21	± 0.34	***	2.83	± 0.31	*	4.24	± 0.60	****
RL (cm)	15.60	± 0.72	-	19.40	± 0.81	**	18.30	± 0.86	*	20.40	± 0.89	***
RD (mm)	5.05	± 0.28	-	6.80	± 0.33	*	7.48	± 0.92	**	7.78	± 0.48	***
NRB	8.04	± 0.67	-	14.70	± 0.73	****	13.60	± 0.73	***	18.20	± 1.28	****
RV (cm ³ plant ⁻¹)	2.82	± 0.37	-	5.69	± 0.60	***	5.38	± 0.48	**	8.06	± 0.85	****

Table S4. Central glomerule length (cm) by genotype and treatment

Genotype	Treatment	Mean	E.E	Pr(>F)
BJ	TR1	5.48	0.28	-
BJ	TR2	9.68	0.86	***
BJ	TR3	9.11	0.46	**
BJ	TR4	10.00	0.17	****
NC	TR1	7.85	0.21	-
NC	TR2	7.67	0.33	ns
NC	TR3	7.92	0.57	ns
NC	TR4	8.48	0.73	ns
RP	TR1	8.14	0.40	-
RP	TR2	12.8	1.26	***
RP	TR3	10.90	1.05	*
RP	TR4	15.20	0.20	****
SH	TR1	4.85	0.95	-
SH	TR2	6.40	1.03	ns
SH	TR3	7.15	0.88	ns
SH	TR4	8.49	0.68	**

Table S5. Grain diameter (mm) by genotype and treatment.

Genotype	Treatment	Mean	E.E	Pr(>F)
BJ	TR1	1.56	0.01	-
BJ	TR2	1.72	0.00	****
BJ	TR3	1.71	0.00	****
BJ	TR4	1.83	0.00	****
NC	TR1	1.51	0.00	-
NC	TR2	1.64	0.00	***
NC	TR3	1.61	0.00	**
NC	TR4	1.65	0.00	***
RP	TR1	1.99	0.05	-
RP	TR2	2.29	0.01	****
RP	TR3	2.09	0.00	**
RP	TR4	2.16	0.05	****
SH	TR1	1.51	0.00	-
SH	TR2	1.64	0.00	***
SH	TR3	1.61	0.00	**
SH	TR4	1.65	0.00	***

Table S6. Hectoliter weight (g·hL⁻¹) by genotype and treatment.

Genotype	Treatment	Mean	E.E	Pr(>F)
BJ	TR1	595.00	23.00	-
BJ	TR2	603.00	19.00	ns
BJ	TR3	546.67	13.30	*
BJ	TR4	553.33	16.70	ns
NC	TR1	534.67	6.36	-
NC	TR2	418.33	1.67	****
NC	TR3	491.33	0.66	*
NC	TR4	489.33	0.66	*
RP	TR1	591.00	0.00	-
RP	TR2	602.00	0.00	ns
RP	TR3	583.33	1.33	ns
RP	TR4	602.00	1.00	ns
SH	TR1	569.33	24.5	-
SH	TR2	586.00	18.00	ns
SH	TR3	538.00	11.00	ns
SH	TR4	536.67	16.70	ns

Table S7. Root dry weight (g plant⁻¹) by genotype and treatment.

Genotype	Treatment	Mean	E.E	Pr(>F)
BJ	TR1	3.18	0.03	-
BJ	TR2	3.53	0.11	ns
BJ	TR3	3.00	0.30	ns
BJ	TR4	6.46	0.77	***
NC	TR1	1.10	0.62	-
NC	TR2	1.52	0.20	ns
NC	TR3	1.71	0.52	ns
NC	TR4	2.06	0.64	ns
RP	TR1	1.38	0.24	-
RP	TR2	4.38	0.42	***
RP	TR3	3.75	0.69	**
RP	TR4	3.16	0.64	*
SH	TR1	1.54	0.09	-
SH	TR2	3.39	0.49	*
SH	TR3	2.86	0.48	ns
SH	TR4	5.28	0.81	****