

Supplementary Material

Impact of an arbuscular mycorrhizal fungus on the growth and nutrition of fifteen crop and pasture plant species

Binh T. T. Tran^{A,B}, Stephanie J. Watts-Williams^{A,C} and Timothy R. Cavagnaro^{A,D}

^AThe Waite Research Institute and The School of Agriculture, Food and Wine, The University of Adelaide, Waite Campus, PMB1 Glen Osmond, SA 5064, Australia.

^BFaculty of Agriculture and Forestry, Tay Nguyen University, Buon Ma Thuot city, Daklak Province, 63131, Vietnam.

^CAustralian Research Council Centre of Excellence in Plant Energy Biology, University of Adelaide, Waite Campus, PMB1 Glen Osmond, SA 5064, Australia.

^DCorresponding author. Email: timothy.cavagnaro@adelaide.edu.au

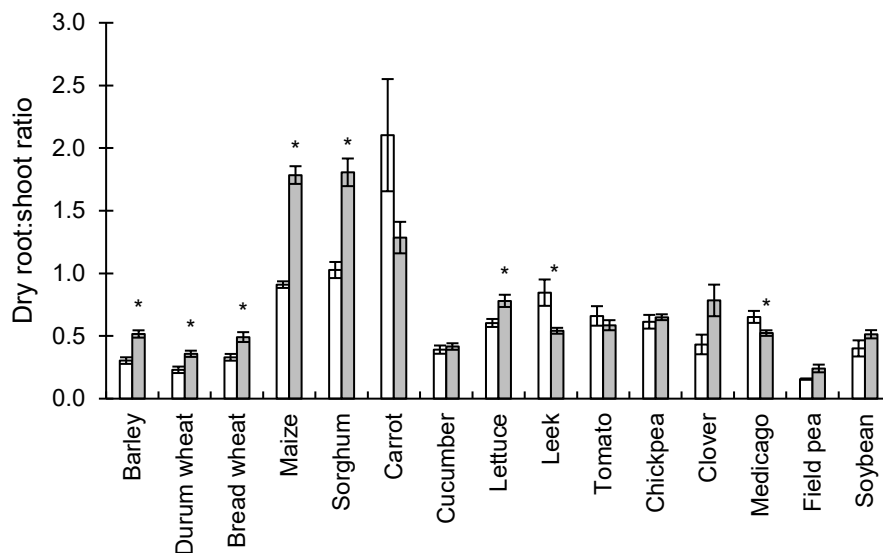


Fig. S1. The dry root to shoot ratio of 15 host crops that were inoculated with the mycorrhizal fungus *R. irregularis* (grey bars) or non-mycorrhiza (white bars). Values are mean \pm s.e., $n = 4$. Significant differences between mycorrhizal and nonmycorrhizal treatments within a given plant species are indicated with an asterisk placed above bars.

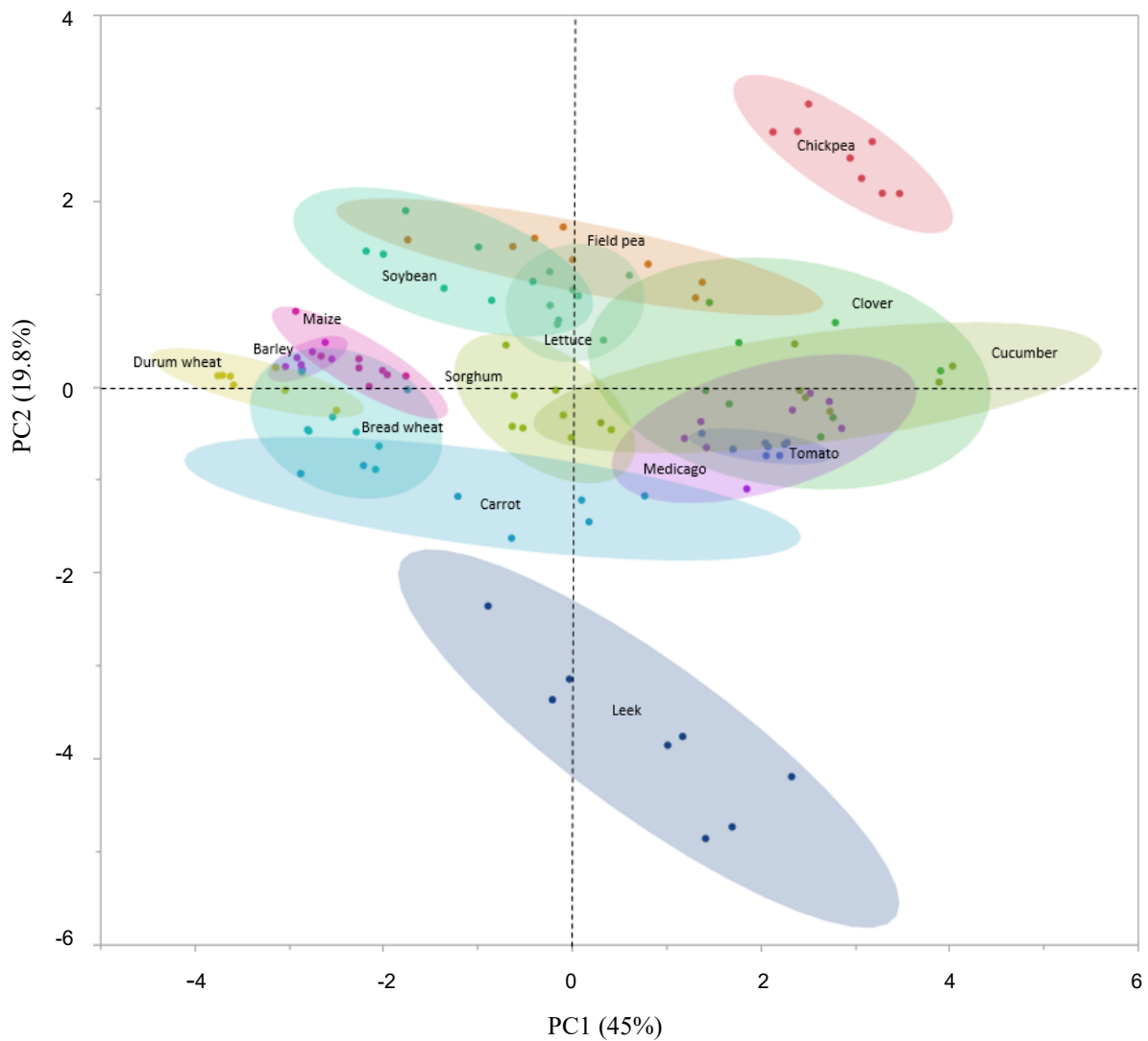


Fig. S2. Principal components analysis of mineral nutrients of shoot of 15 host crops for 9 mineral nutrients (P, Ca, Ma, K, Mn, Zn, Cu, S, and Fe) and shoot DW. Values are \log_{10} of means, $n = 8$. The ellipses represents the distribution of \log_{10} of means at the 95% confidence interval.

Table S1. Summary of one way ANOVA for all variables, $n=4$

Variable	p for all crop species
AM colonisation	0.015
MR: biomass	<0.0001
MR: N	<0.0001
MR: P	<0.0001
MR: Zn	<0.0001
MR: Fe	<0.0001
MR: Mn	<0.0001
MR: Ca	<0.0001
MR: K	<0.0001
MR: Mg	<0.0001
MR: S	<0.0001
MR: Cu	<0.0001

Table S2. Concentration of mineral nutrients (N, P, Zn, Fe, Mn, Ca, K, Mg, S and Cu) in the shoot and edible part (where present) of 15 plant species

Values are mean \pm SE, $n=4$

Nutrient	N (mg kg ⁻¹)				P (mg kg ⁻¹)				Zn (μ g kg ⁻¹)				Fe (μ g kg ⁻¹)				Mn (μ g kg ⁻¹)			
	NMF		AMF		NMF		AMF		NMF		AMF		NMF		AMF		NMF		AMF	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Barley	15,225	3,162	13,500	500	2,121	68	1,726	23	32	0.8	42	3.9	109	25.8	66	3.9	50	2.6	74	2.4
Durum wheat	15,500	289	16,250	629	1,701	36	1,779	47	51	2.6	69	4.1	78	14.1	72	9.5	45	1.8	58	4.0
Bread wheat	17,250	629	17,500	289	2,301	112	2,364	100	55	4.3	61	1.9	176	47.7	81	9.5	64	7.6	59	2.1
Maize	13,500	289	14,250	250	1,692	175	1,661	48	35	0.4	46	2.0	154	34.4	84	9.9	75	1.8	84	2.6
Sorghum	18,000	1,225	18,500	500	2,023	107	2,302	53	67	5.9	65	2.3	249	45.6	106	9.2	96	5.3	109	1.3
Carrot	20,500	1,936	21,500	645	1,621	146	2,203	110	32	5.2	51	5.8	111	5.2	165	14.2	104	12.7	102	7.8
Cucumber	18,500	289	17,750	629	3,387	154	3,193	83	99	4.5	93	11.8	1,170	356.7	341	93.8	135	8.8	117	21.7
Lettuce	15,250	479	15,250	854	2,020	70	1,993	69	66	5.5	70	3.3	437	59.5	267	20.7	314	13.2	311	14.6
Leek					1,502	195	3,360	181	54	4.4	81	11.1	411	37.4	201	28.1	121	3.3	91	10.1
Tomato	15,750	479	16,750	250	2,426	66	2,600	57	81	3.5	88	1.1	111	5.4	123	9.3	326	23.8	314	15.4
Chickpea	15,750	854	16,250	250	1,865	41	2,396	99	93	5.7	106	3.6	679	55.5	769	51.1	1,115	107.4	998	55.6
Clover	15,250	854	19,250	750	1,590	22	2,026	229	109	19.0	122	7.3	324	75.5	293	37.7	185	26.4	164	28.5
Medicago	23,500	1,500	28,500	2,466	2,052	125	2,358	93	84	2.7	73	3.7	505	15.1	200	26.8	197	5.7	92	4.7
Field pea	14,000	0	14,500	289	2,016	93	1,986	57	74	6.6	88	11.5	245	12.1	270	70.7	151	32.2	131	4.4
Soybean	15,750	250	16,200	735	1,484	124	1,752	80	57	17.6	52	2.4	152	56.9	98	7.1	116	2.8	131	8.3

Nutrient	Ca (mg kg ⁻¹)				K (mg kg ⁻¹)				Mg (mg kg ⁻¹)				S (mg kg ⁻¹)				Cu (μ g kg ⁻¹)			
	NMF		AMF		NMF		AMF		NMF		AMF		NMF		AMF		NMF		AMF	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Barley	2,527	46	2,669	101	17,520	147	17,627	602	1,555	23	1,871	35	1,382	21	1,485	37	8.0	0.3	8.5	0.7
Durum wheat	1,163	41	1,278	27	14,141	212	14,861	562	1,064	57	1,204	37	1,909	84	2,224	120	4.1	0.2	5.7	0.8
Bread wheat	1,282	89	1,262	37	16,900	630	16,564	679	1,256	50	1,386	11	2,150	145	2,400	64	5.5	0.1	5.2	0.2
Maize	4,431	135	4,617	136	22,811	988	23,368	747	4,060	77	4,396	183	1,426	41	1,314	16	3.4	0.2	3.6	0.3
Sorghum	5,550	416	6,522	370	22,807	1,278	25,021	667	3,354	141	3,783	195	1,843	119	1,818	31	9.2	0.8	9.0	0.4
Carrot	10,044	1,233	13,639	563	29,958	1,121	32,134	558	2,505	187	3,319	293	2,132	246	2,823	89	6.3	1.0	8.3	0.5
Cucumber	16,880	727	14,498	753	19,387	834	18,099	469	7,882	256	7,411	574	4,495	197	4,280	357	14.7	4.4	6.8	0.7
Lettuce	6,869	158	6,933	304	22,389	557	22,789	1,059	3,637	50	3,450	132	1,498	13	1,618	69	5.7	0.4	5.4	0.2
Leek	7,480	575	7,793	447	34,309	5,599	47,037	2,520	2,800	138	2,882	125	6,182	1,659	6,689	730	4.4	0.7	8.5	0.5
Tomato	18,706	723	19,124	439	29,358	853	27,844	582	4,931	176	5,117	125	5,008	191	5,093	109	10.1	0.3	11.4	0.3
Chickpea	23,799	1,346	22,437	159	9,542	248	10,696	368	5,225	188	5,110	229	2,334	169	2,600	100	10.7	1.4	13.5	1.0
Clover	20,314	1,825	17,853	923	23,212	1,605	19,599	1,066	5,762	584	4,295	246	3,394	347	4,301	296	18.2	3.9	20.3	1.1
Medicago	23,560	1,207	17,811	796	19,265	831	17,389	900	7,660	283	5,291	256	4,979	115	4,601	121	9.9	0.3	10.7	0.4
Field pea	11,641	1,926	11,566	340	12,103	621	12,493	1,304	3,253	316	3,500	426	2,079	1	2,504	208	6.1	1.0	8.2	1.0
Soybean	12,046	244	13,251	1,171	12,504	355	12,088	558	3,305	129	3,347	177	1,951	164	2,024	29	5.2	1.3	5.0	0.3

Table S3. Critical levels of Phosphorus (P %) in the shoots of 14 plant species included in this study

These data are sourced Reuter and Robinson (1997)

Order	Crops (developmental stage)	P(%)			
		Deficient	Critical	Marginal	Adequate
1	Barley (FS 10.1-10.5)	<0.15		0.15-0.19	0.2-0.5
2	Durum wheat (FS 10.1-10.5)	0.15-0.19			0.2-0.5
3	Bread wheat (FS 10.1-10.5)				
4	Maize (45-47 DAS)		0.5		
5	Sorghum (49-61 DAS)	0.08-0.1		0.1-0.12	0.14
6	Carrot (root thickening)		0.31		
7	Cucumber (mid-Fl)	2.8-3.4	0.44		0.34-125
8	Lettuce (head)		0.4-0.6		
9	Tomato leaf (42 DAT)				0.98
10	Chickpea (42 DAS)	0.09-0.25			0.29-0.33
11	Clover (60 1 st -Fl)		0.51		0.3-0.5
12	Medicago (pre-Fl - Fl)		0.26		
13	Field pea (28 DAS)	<0.53			>0.64
14	Soybean (33 DAS)				0.33-0.4