

Supplementary Material

The spatial distribution of soil nitrogen determines responses of *Sorghum bicolor* to banded phosphorus fertiliser

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Table S1: Aboveground biomass accumulation (g DM column⁻¹) and partitioning across plant structures in sorghum grown until physiological maturity with contrasting P placements and soil N distributions. Values are the mean ± SEM.

N distribution	Main stem shoot (g DM column ⁻¹)	Main stem panicle (g DM column ⁻¹)	Tiller shoot (g DM column ⁻¹)	Tiller panicle (g DM column ⁻¹)	Total aboveground biomass (g DM column ⁻¹)
Positive control (dispersed P and N)					
	99.8 ± 2.90	88.18 ± 2.90	11.31 ± 4.92	2.96 ± 2.96	202.25 ± 12.52
Dispersed P					
Top	99.24 ± 5.27	85.78 ± 5.67	6.19 ± 3.31	2.42 ± 0.85	194.98 ± 9.68
Middle	93.09 ± 3.62	75.69 ± 3.62	8.58 ± 4.65	4.88 ± 8.73	176.43 ± 14.74
Bottom	91.04 ± 8.63	73.62 ± 8.63	5.55 ± 4.99	0.04 ± 0.07	164.42 ± 18.24
Banded P					
Uniform	80.57 ± 5.33	69.98 ± 5.33	10.79 ± 9.25	0.00 ± 0.00	160.34 ± 13.39
Top	95.53 ± 4.64	83.23 ± 4.64	12.60 ± 4.87	4.11 ± 1.88	196.16 ± 14.17
Middle	81.48 ± 4.84	69.88 ± 4.84	6.15 ± 2.17	0.00 ± 0.00	157.51 ± 9.543
Bottom	79.39 ± 4.78	67.79 ± 4.78	1.54 ± 0.72	0.00 ± 0.00	148.72 ± 9.85
<i>p</i> P placement	0.005*	0.005*	0.999	0.525	0.006*
<i>p</i> N location	0.128	0.128	0.898	0.475	0.090
<i>p</i> P × N	0.435	0.435	0.388	0.305	0.264

Table S2: Plant P uptake (mg P column⁻¹) and distribution across aboveground plant structures of sorghum grown until physiological maturity with contrasting P placements and soil N distributions. Values are the mean ± SEM

N distribution	Main stem shoot (mg P column ⁻¹)	Main stem panicle (mg P column ⁻¹)	Tiller shoot (mg P column ⁻¹)	Tiller panicle (mg P column ⁻¹)	Total P uptake (mg P column ⁻¹)
Positive control (dispersed P and N)					
	139.75 ± 16.12	284.02 ± 20.19	11.27 ± 5.45	5.04 ± 5.04	440.07 ± 38.80
Dispersed P					
Top	137.37 ± 11.48	249.88 ± 17.10	7.91 ± 4.32	1.48 ± 1.32	396.64 ± 23.07
Middle	151.62 ± 17.22	248.23 ± 17.41	12.58 ± 4.25	20.50 ± 18.33	432.92 ± 20.56
Bottom	101.80 ± 19.17	209.70 ± 28.44	18.79 ± 11.02	0.25 ± 0.23	330.54 ± 42.93
Banded P					
Uniform	81.95 ± 3.31	170.83 ± 17.21	9.77 ± 8.31	0.00 ± 0.00	262.56 ± 11.84
Top	79.93 ± 3.85	204.49 ± 21.29	13.19 ± 5.80	7.75 ± 4.82	304.72 ± 32.71
Middle	79.35 ± 5.99	181.66 ± 17.96	9.06 ± 2.89	0.00 ± 0.00	272.23 ± 19.88
Bottom	67.02 ± 10.90	145.81 ± 21.61	1.89 ± 0.88	0.00 ± 0.00	208.88 ± 29.44
<i>p</i> P placement	<0.0001*	<0.0001*	0.557	0.510	<0.0001*
<i>p</i> N location	0.040*	0.007*	0.931	0.486	0.002*
<i>p</i> P x N	0.650	0.0287*	0.329	0.330	0.069

Table S3: Plant N uptake (mg N column⁻¹) and distribution across aboveground plant structures of sorghum grown until physiological maturity with contrasting P placements and soil N distributions. Values are the mean ± SEM

N distribution	Main stem shoot (mg N column ⁻¹)	Main stem panicle (mg N column ⁻¹)	Tiller shoot (mg N column ⁻¹)	Tiller panicle (mg N column ⁻¹)	Total N uptake (mg N column ⁻¹)
Positive control (dispersed P and N)					
	1107.00 ± 48.23	1469.97 ± 41.11	125.88 ± 54.72	50.37 ± 50.37	2750.22 ± 148.46
Dispersed P					
Top	1090.02 ± 104.52	1427.56 ± 138.69	73.78 ± 37.45	13.58 ± 12.14	2604.94 ± 257.63
Middle	1128.21 ± 27.21	1414.44 ± 47.57	133.22 ± 47.85	145.42 ± 130.07	2821.30 ± 183.32
Bottom	852.93 ± 123.69	1127.43 ± 211.73	118.61 ± 79.84	1.4 ± 1.25	2122.69 ± 392.95
Banded P					
Uniform	882.25 ± 52.36	1127.43 ± 85.53	118.61 ± 68.68	0.00 ± 0.00	2128.9 ± 176.996
Top	1004.60 ± 74.44	1312.14 ± 118.65	167.68 ± 68.68	39.63 ± 0.00	2524.05 ± 282.831
Middle	833.18 ± 26.25	1096.62 ± 77.51	78.58 ± 24.65	0.00 ± 0.00	2008.38 ± 116.56
Bottom	720.27 ± 91.58	965.52 ± 115.93	24.51 ± 11.78	0.00 ± 0.00	1710.30 ± 235.10
<i>p</i> P placement	<0.0001*	<0.0001*	0.971	0.431	0.001*
<i>p</i> N location	0.001*	0.248	0.906	0.48	0.040*
<i>p</i> P × N	0.363	0.690	0.338	0.370	0.249

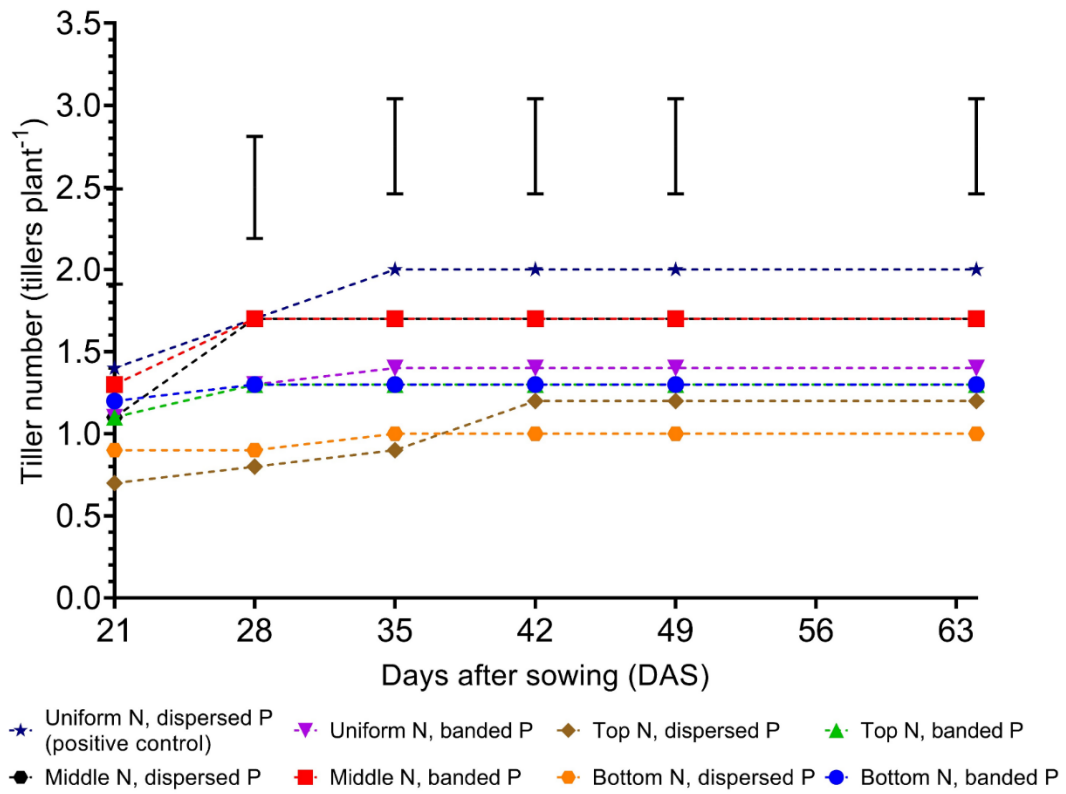


Fig. S1: Number of tillers (tillers plant⁻¹) through time of sorghum grown until physiological maturity with contrasting P placements and soil N distributions. Error bars represent SEM