

Table S1. Composition of Knop solution

With Pi		With Phi		Without P	
Composition	Concentration (mg/L)	Composition	Concentration (mg/L)	Composition	Concentration (mg/L)
$\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	1150	$\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	1150	$\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	1150
KH_2PO_4	200	KH_2PO_3	200	/	/
KNO_3	200	KNO_3	200	KNO_3	200
$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	200	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	200	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	200
EDTA-Fe	25	EDTA-Fe	25	EDTA-Fe	25
H_3BO_3	2.86	H_3BO_3	2.86	H_3BO_3	2.86
$\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$	2.13	$\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$	2.13	$\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$	2.13
$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	0.22	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	0.22	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	0.22
$(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$	0.08	$(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$	0.08	$(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$	0.08
$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	0.02	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	0.02	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	0.02

Table S2. Dry height of plant in sand culture experiments (g/plant)

	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7
ptxD-expressing plants	6.7735	8.5675	10.5225	9.453	10.6375	9.959	6.532
xiangyou18 plants	1.029	0.8295	1.4175	1.239	1.3125	1.0395	1.638

Plants were grown in a greenhouse at 25 °C in a 12:12h light/dark cycle with a photon density of approximately $200 \mu\text{M m}^{-2} \cdot \text{s}^{-1}$ and 60-70% humidity.

Table S3. Total phosphorus content in plants (mmol/g)

	<i>ptxD</i> -expressing plants			Xiangyou18 plants		
	Plant 1	Plant 2	Plant 3	Plant 1	Plant 2	Plant 3
Knop solution with Phi	160.48	176.93	185.56	249.95	236.17	264.98
Knop solution with Pi	188.56	176.93	164.49	183.96	166.12	182.99
Knop solution without P	78.23	102.111	95.29	86.98	92.06	109.99

Table S4. N, P, K content of soil (mg/kg of soil)

	Available phosphorus	Available potassium	Alkaline hydrolyzable nitrogen
Plot 1	4.76	48.96	38.50
	4.43	45.73	42.97
	9.56	43.04	34.54
	11.28	49.11	39.70
	7.89	44.55	37.29
Plot 2	11.78	51.85	40.01
	6.46	42.17	37.58
	7.34	57.86	45.44
	8.74	46.74	39.76
	9.38	42.29	34.84
Plot 3	3.54	44.29	37.80
	8.45	56.27	44.60
	6.78	49.16	40.69
	7.98	52.79	37.27
	9.45	50.97	43.46
	7.85	48.39	39.63

Table S5. Dry weight of weed in pot culture experiments (g/pot)

Phi concentration (mg/kg of soil)		<i>M. aquaticum</i> (g/pot)	<i>A. aequalis</i> (g/pot)	<i>R. acetosa</i> (g/pot)
0	Pot 1	5.44	7.35	6.23
	Pot 2	7.18	9.26	8.04
	Pot 3	7.89	10.29	8.10
12.5	Pot 1	5.33	7.20	6.11
	Pot 2	7.33	9.45	8.20
	Pot 3	8.68	11.32	8.91
25	Pot 1	5.12	6.84	5.74
	Pot 2	7.27	9.37	8.14
	Pot 3	6.71	12.87	7.29
50	Pot 1	2.83	7.06	5.36
	Pot 2	4.45	9.45	6.59
	Pot 3	4.81	9.37	7.46
100	Pot 1	1.31	6.18	2.74
	Pot 2	2.30	7.04	2.57
	Pot 3	2.29	7.93	2.35
200	Pot 1	0.71	3.60	1.46

	Pot 2	0.50	2.50	0.80
	Pot 3	0.63	3.29	0.73

Table S6. Number of plant in different Phi applications (number/m²)

	Plot 1	Plot 2	Plot 3
WT+No	25	30	29
WT+Pi	25	26	25
<i>ptxD</i> +Pi	25	28	22
WT+Phi	21	19	25
<i>ptxD</i> +Phi	32	29	36

Table S7. Number of green leaves per plant in different Phi applications

	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Plant 10
WT+No	4	5	6	6	6	6	6	7	5	4
WT+Pi	5	4	6	5	6	6	6	5	5	5
<i>ptxD</i> +Pi	3	7	6	6	7	5	5	6	5	6
WT+Phi	4	7	6	5	7	6	6	7	6	6
<i>ptxD</i> +Phi	6	7	7	5	7	8	8	6	6	7

Table S8. Dry height of plant in fields with different Phi applications (g/plant)

	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8	Plant 9	Plant 10
WT+No	0.78	0.63	0.83	0.54	0.98	1.20	1.50	0.78	0.38	0.75
WT+Pi	2.01	3.25	1.89	3.15	1.38	0.98	2.56	1.05	0.98	2.12
<i>ptxD</i> +Pi	1.01	1.08	2.35	2.11	2.22	3.78	3.12	2.01	1.08	0.98
WT+Phi	0.99	0.98	1.25	0.79	1.18	1.35	1.56	0.75	0.44	0.35
<i>ptxD</i> +Phi	9.25	7.45	8.66	5.89	5.68	8.22	9.15	5.56	5.89	9.53