Supplementary Tables

Table S1. Mean performance for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self- and open pollinated maize seeds under optimal conditions during season 1

Hybrids	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
SMH1	Self	21.49	22.98	4.99	20.21	21.39
	Open	13.73	19.30	5.48	24.05	26.12
SMH2	Self	17.61	22.21	4.74	23.54	21.04
	Open	15.13	20.95	4.91	20.12	21.50
SMH3	Self	19.21	24.01	4.34	19.64	17.82
	Open	18.19	19.93	5.14	22.26	24.29
SMH4	Self	20.06	25.38	5.20	22.23	20.15
	Open	13.68	21.73	5.16	20.49	22.39
SMH5	Self	19.74	20.46	5.29	22.75	25.32
	Open	15.07	19.88	4.58	19.99	21.41
SMH6	Self	18.42	20.15	4.50	21.95	22.15
	Open	15.24	19.78	4.88	20.88	22.48
SMH7	Self	17.19	19.55	5.16	27.05	25.99
	Open	13.73	17.03	4.97	24.43	26.24
SMH8	Self	19.81	20.68	5.40	23.31	25.64
	Open	14.58	16.22	4.68	24.72	26.72
SMH9	Self	17.33	18.53	4.62	22.26	24.64
	Open	13.43	19.49	5.42	23.45	25.38
SMH10	Self	17.06	20.30	4.86	24.27	25.54
	Open	14.76	18.52	5.02	23.38	24.89
SMH11	Self	17.80	18.20	4.49	21.44	24.40
	Open	14.30	18.34	5.11	24.08	25.96
SMH12	Self	17.45	21.93	4.18	20.52	18.94
	Open	16.63	19.11	5.15	22.99	24.91
SMH13	Self	19.43	20.73	5.83	25.97	27.64
	Open	12.84	18.73	5.68	25.79	28.14
SMH14	Self	15.28	19.23	4.36	26.08	22.41
	Open	12.28	17.39	4.35	21.17	22.43
SMH15	Self	18.74	19.46	5.21	23.55	26.56
	Open	15.39	16.41	5.11	26.72	28.95
SMH16	Self	15.11	19.23	5.05	28.73	25.97
	Open	13.32	20.68	5.37	22.25	24.21
SMH17	Self	18.95	19.83	4.64	21.10	23.06
	Open	12.56	17.03	4.94	24.91	26.83
SMH18	Self	19.36	19.99	5.47	24.00	27.40
	Open	16.23	19.86	4.67	20.04	21.73
$LSD_{0.05}$	Self	0.74	0.69	0.54	3.17	3.02
	Open	083	1.53	0.22	1.77	2.04

SMH=Sajjad maize hybrid, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa, LSD=least significant difference.

Table S2. Analysis of variance showing mean squares for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under optimal conditions during season 1

Source	df	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
Block	2	Self	0.74	0.31	0.09	4.37	2.50
		Open	1.62	2.04	0.03	3.70	4.77
Location (L)	1	Self	225.07***	6.21***	1.21**	231.45***	7.52
		Open	73.91***	21.33***	14.85***	171.42***	1138.39***
Entry (E)	17	Self	10.81***	14.54***	0.82***	24.15***	234.29***
		Open	13.81***	15.10***	0.68***	26.10***	32.02***
E × L	17	Self	14.40***	10.43***	0.48**	39.41***	28.56***
		Open	12.32***	11.12***	0.62***	20.31***	26.94***
Residual	34	Self	0.38	0.33	0.20	7.04	6.37
		Open	0.74	2.49	0.05	3.36	4.44
R^2 value		Self	0.98	0.97	0.77	0.85	0.83
		Open	0.96	0.84	0.96	0.90	0.94

** $P \leq 0.01$, *** $P \leq 0.001$, df=degrees of freedom, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa.

Table S3. Mean performance for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under low N conditions during season 1

Hybrids	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
SMH1	Self	20.98	17.43	6.03	25.66	37.38
	Open	18.37	15.22	4.79	29.36	34.08
SMH2	Self	22.11	18.97	6.27	24.15	34.85
	Open	17.15	18.86	5.58	27.56	31.99
SMH3	Self	19.80	20.09	5.95	27.85	32.32
	Open	12.90	15.89	5.08	28.47	33.05
SMH4	Self	17.98	21.34	6.52	33.20	31.54
	Open	17.64	15.99	5.50	31.01	35.99
SMH5	Self	14.10	16.53	6.08	36.67	37.57
	Open	17.02	14.62	6.01	38.89	45.14
SMH6	Self	16.69	16.36	5.37	27.39	30.58
	Open	19.21	14.79	4.47	29.19	33.88
SMH7	Self	21.85	15.79	6.63	26.15	36.23
	Open	15.10	17.22	5.19	26.69	30.98
SMH8	Self	14.64	18.47	5.51	32.05	31.69
	Open	12.34	13.75	5.55	37.09	43.05
SMH9	Self	14.24	14.98	5.73	34.61	40.35
	Open	16.20	15.77	4.85	26.36	30.60
SMH10	Self	18.75	19.21	6.10	27.67	31.34
	Open	18.18	16.43	5.32	28.54	33.13
SMH11	Self	17.89	21.31	4.94	23.46	29.49
	Open	20.77	17.30	5.00	24.67	28.63
SMH12	Self	19.70	15.61	5.51	25.13	35.85
	Open	12.38	16.55	4.87	25.67	29.80
SMH13	Self	19.11	17.49	5.99	26.64	31.65
	Open	17.08	15.38	5.49	30.94	35.91
SMH14	Self	12.88	15.74	5.84	38.62	29.41
	Open	11.58	15.32	5.20	28.69	33.30
SMH15	Self	17.11	15.66	5.52	28.07	39.17
	Open	14.68	16.51	5.46	29.92	34.73
SMH16	Self	20.83	18.41	5.92	24.08	29.35
	Open	14.26	12.51	5.69	39.23	45.54
SMH17	Self	17.50	15.68	4.86	24.12	27.99
	Open	18.73	15.56	5.09	27.92	32.41
SMH18	Self	14.34	16.71	5.47	32.48	31.37
	Open	12.57	18.57	4.47	25.57	29.67
$LSD_{0.05}$	Self	0.81	1.66	0.66	3.98	5.12
	Open	0.70	1.67	0.61	4.97	5.76

SMH=Sajjad maize hybrid, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa, LSD=least significant difference.

Table S4. Analysis of variance showing mean squares for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under low N conditions during season 1

Source	df	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
Block	2	Self	0.11	6.39	0.67	18.23	16.95
		Open	0.65	1.99	0.18	35.52	47.80
Location (L)	1	Self	136.73***	3.66	1.56*	78.06**	141.15**
		Open	104.56***	301.76***	21.02***	593.76***	799.99***
Entry (E)	17	Self	32.67***	16.06***	0.91**	86.99***	55.08**
		Open	45.91***	11.78***	1.04**	114.36***	154.04***
E × L	17	Self	20.52***	10.11***	1.14***	90.05***	90.63***
		Open	26.16***	24.54***	0.71*	121.37***	163.49***
Residual	34	Self	0.46	1.93	0.31	11.08	18.31
		Open	0.52	2.98	0.40	26.36	35.52
R^2 value		Self	0.99	0.88	0.78	0.90	0.81
		Open	0.99	0.92	0.80	0.85	0.84

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$, df=degrees of freedom, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa.

Table S5. Mean performance for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under optimal conditions during season 2

Hybrids	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
SMH1	Self	21.24	22.08	6.11	24.37	27.33
	Open	19.95	23.14	6.29	27.08	27.37
SMH2	Self	16.21	21.64	5.47	29.28	26.33
	Open	19.46	20.74	5.31	23.30	25.64
SMH3	Self	12.64	21.98	5.85	41.40	28.03
	Open	20.05	22.44	5.92	25.44	25.93
SMH4	Self	20.23	23.30	5.93	26.45	27.29
	Open	21.65	24.80	5.90	23.39	23.45
SMH5	Self	19.86	18.86	5.44	23.49	29.54
	Open	20.16	22.23	5.71	24.15	25.27
SMH6	Self	18.79	19.11	5.71	27.60	32.07
	Open	15.77	20.22	5.82	31.74	28.52
SMH7	Self	17.01	18.90	6.28	31.34	32.77
	Open	17.56	18.81	5.88	29.66	30.84
SMH8	Self	18.40	17.95	5.38	24.85	32.12
	Open	17.20	18.33	5.31	26.32	28.66
SMH9	Self	19.99	19.58	6.22	26.45	31.37
	Open	19.06	19.51	5.62	25.11	28.30
SMH10	Self	18.15	19.75	5.80	28.50	30.56
	Open	19.76	19.87	5.61	24.91	28.19
SMH11	Self	20.70	18.80	6.27	28.51	34.71
	Open	21.94	18.38	5.18	20.33	27.87
SMH12	Self	18.79	18.74	5.08	23.46	28.59
	Open	19.82	18.64	5.47	23.47	29.06
SMH13	Self	15.71	19.43	6.30	34.07	33.27
	Open	17.67	21.29	6.06	30.65	28.21
SMH14	Self	17.79	20.80	5.55	26.59	26.21
	Open	16.41	18.59	5.58	29.29	30.10
SMH15	Self	15.19	18.78	6.04	33.80	32.37
	Open	18.01	19.57	5.88	28.44	29.79
SMH16	Self	17.55	19.88	6.02	29.17	31.06
	Open	17.99	19.16	6.02	29.65	31.36
SMH17	Self	21.93	19.81	5.85	26.29	31.94
	Open	20.09	19.82	5.57	23.87	28.32
SMH18	Self	20.08	19.26	4.98	21.07	25.62
	Open	21.94	20.30	5.63	21.77	27.70
$LSD_{0.05}$	Self	0.96	1.31	0.41	3.34	3.07
	Open	1.00	0.92	0.26	2.37	1.91

SMH=Sajjad maize hybrid, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa, LSD=least significant difference.

Table S6. Analysis of variance showing mean squares for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under optimal conditions during season 2

Source	df	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
Block	2	Self	1.26	0.87	0.16	22.82	6.47
		Open	0.31	0.28	0.20	3.04	6.14
Location (L)	1	Self	131.38***	637.90***	15.77***	977.85***	3325.75***
		Open	4.65**	157.57***	3.29***	122.67***	101.57***
Entry (E)	17	Self	22.45***	8.36***	0.67***	90.96***	30.44***
		Open	19.85***	19.83***	0.50***	63.60***	23.84***
E × L	17	Self	26.84***	13.55***	0.62***	88.15***	54.01***
		Open	21.17***	6.98***	0.46***	38.47***	16.07***
Residual	34	Self	0.64	1.20	0.12	7.81	6.60
		Open	1.07	0.90	0.07	6.01	3.90
R^2 value		Self	0.98	0.96	0.90	0.94	0.96
		Open	0.95	0.95	0.90	0.90	0.85

** P ≤ 0.01, *** P ≤ 0.001, df=degrees of freedom, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa.

Table S7. Mean performance for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under low N conditions during season 2

Hybrids	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
SMH1	Self	10.87	22.72	6.89	55.64	30.09
	Open	18.64	23.00	6.66	32.59	29.19
SMH2	Self	16.27	27.58	6.20	33.39	22.49
	Open	15.04	23.00	6.52	38.00	28.31
SMH3	Self	16.41	20.63	6.03	33.45	29.00
	Open	14.58	23.56	6.92	43.44	29.31
SMH4	Self	14.09	22.17	6.32	41.01	28.45
	Open	18.25	23.23	6.32	30.21	26.98
SMH5	Self	17.04	24.41	6.80	34.17	27.44
	Open	16.18	22.35	6.42	34.99	28.43
SMH6	Self	15.48	20.46	6.13	33.75	29.62
	Open	14.38	19.65	5.96	35.32	30.43
SMH7	Self	16.42	19.13	6.39	33.73	32.92
	Open	12.56	19.95	6.99	48.82	34.57
SMH8	Self	12.44	18.87	6.43	47.20	33.89
	Open	13.54	19.00	6.73	42.71	35.39
SMH9	Self	13.99	18.19	6.19	37.49	34.72
	Open	16.29	17.90	6.36	37.34	35.02
SMH10	Self	16.75	22.63	6.43	34.07	28.44
	Open	12.46	20.33	6.56	45.02	31.81
SMH11	Self	13.98	20.32	5.55	33.90	27.32
	Open	13.83	18.83	6.38	40.30	33.83
SMH12	Self	11.83	17.87	6.38	47.34	35.79
	Open	14.75	18.63	5.90	34.99	31.65
SMH13	Self	11.50	16.83	6.07	45.25	36.85
	Open	14.89	21.40	6.76	38.73	31.42
SMH14	Self	12.87	18.58	5.90	42.96	31.58
	Open	13.38	18.77	5.74	36.41	30.53
SMH15	Self	16.46	18.80	6.11	31.53	32.09
	Open	14.08	19.74	6.68	41.06	33.45
SMH16	Self	16.48	21.98	6.19	32.29	28.57
	Open	17.15	22.46	6.63	33.89	29.60
SMH17	Self	17.76	21.91	5.61	26.83	25.40
	Open	15.92	21.05	5.65	30.56	26.56
SMH18	Self	15.19	15.90	5.19	29.17	32.51
	Open	17.05	19.99	5.99	30.08	30.06
$LSD_{0.05}$	Self	1.10	1.48	0.33	3.18	2.89
	Open	0.92	1.35	0.31	2.98	2.26

SMH=Sajjad maize hybrid, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa, LSD=least significant difference.

Table S8. Analysis of variance showing mean squares for Fe, Zn, Pa and molar ratios of Fe and Zn with Pa in self and open pollinated maize seeds under low N conditions during season 2

Source	df	Pollination	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Pa (mg g^{-1})	Fe:Pa	Zn:Pa
Block	2	Self	0.50	1.63	0.06	11.59	1.94
		Open	0.58	1.21	0.13	13.17	5.80
Location (L)	1	Self	137.75***	68.33***	9.89***	304.64***	285.26***
		Open	163.05***	139.95***	5.75***	533.26***	608.95***
Entry (E)	17	Self	27.34***	49.35***	1.04***	340.66***	83.29***
		Open	19.81***	20.13***	0.96***	171.12***	43.23***
E × L	17	Self	15.05***	11.94***	0.37***	124.80***	41.98***
		Open	14.16***	3.87**	0.37***	119.08***	11.04**
Residual	34	Self	1.30	2.33	0.12	10.84	8.94
		Open	0.91	1.96	0.10	9.47	5.44
R^2 value		Self	0.95	0.92	0.90	0.95	0.88
		Open	0.96	0.88	0.89	0.94	0.89

** $P \leq 0.01$, *** $P \leq 0.001$, df=degrees of freedom, Fe=iron, Zn=zinc, Pa=phytic acid, Fe:Pa=molar ratio of Fe with Pa, Zn:Pa=molar ratio of Zn with Pa.