

Supplementary Materials

Grain micronutrient evaluation of wheat (*Triticum aestivum*) germplasm and molecular characterisation via genic and random SSR markers

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Supplementary Table S1. Trait variability for GFe and GZn concentrations in 63 wheat breeding lines found during the present study

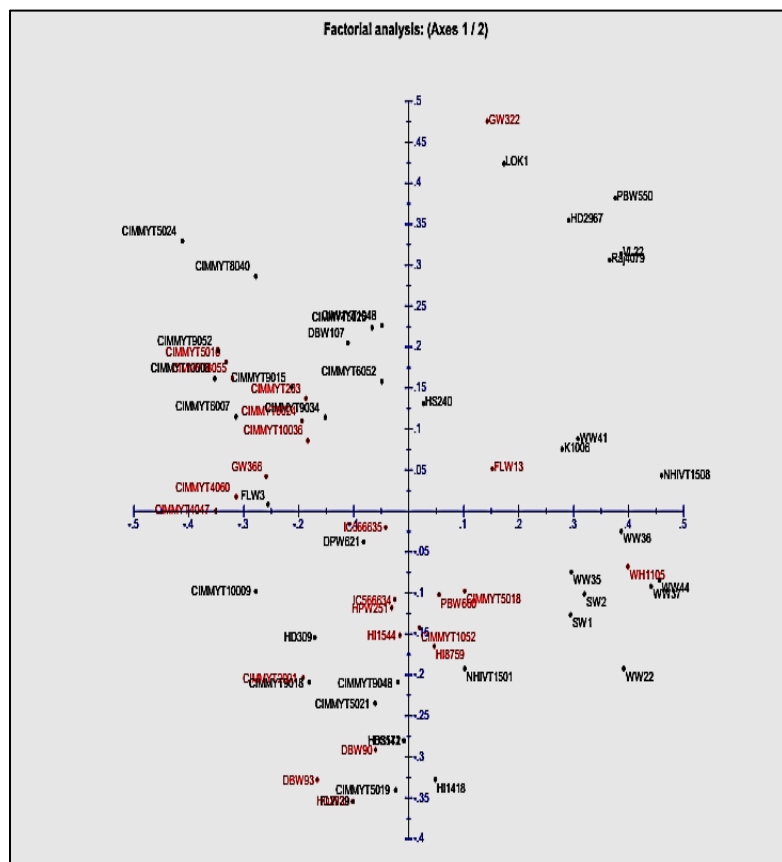
Genotype	GFe (mg kg⁻¹)	Genotype	GZn (mg kg⁻¹)
CIMMYT-10036	67.4 (0.015)	CIMMYT-4047	56.6 (0.018)
CIMMYT-5018	61.5 (0.016)	CIMMYT-5018	56.1 (0.018)
FLW 13	53.1 (0.019)	WH 1105	54.7 (0.018)
WH 1105	47.9 (0.021)	HI 1544	53.4 (0.019)
CIMMYT-5025	47.8 (0.021)	IC 566634	51.6 (0.019)
HPW 251	47.7 (0.021)	CIMMYT-6024	50.3 (0.020)
CIMMYT-4047	47.6 (0.021)	IC 566635	49.2 (0.020)
HI 1544	47.5 (0.021)	CIMMYT-2001	48.6 (0.021)
FLW 29	46.6 (0.021)	CIMMYT-4060	48.3 (0.021)
DBW 107	45.3 (0.022)	HS 542	47.1 (0.021)
IC 566634	45.3 (0.022)	HI 8759	45.9 (0.022)
WW-22	44.2 (0.023)	CIMMYT-10036	45.9 (0.022)
CIMMYT-2034	44.2 (0.023)	HPW 251	45.8 (0.022)
CIMMYT-2001	44.1 (0.023)	PBW 660	45.5 (0.022)
CIMMYT-1048	43.7 (0.023)	FLW 13	45.2 (0.022)
PBW 550	43.6 (0.023)	GW 322	44.6 (0.022)
CIMMYT-6024	43.6 (0.023)	GW 366	44.2 (0.023)
CIMMYT-8055	42.4 (0.023)	DBW 107	44.0 (0.023)
WW-37	42.0 (0.024)	DBW 93	43.5 (0.023)
DBW 90	41.7 (0.024)	CIMMYT-2034	43.5 (0.023)
CIMMYT-4060	41.7 (0.024)	CIMMYT-5019	43.4 (0.023)
CIMMYT-5016	41.6 (0.024)	DBW 90	42.9 (0.023)
CIMMYT-9018	41.6 (0.024)	LOK 1	42.9 (0.023)
NHIVT-1508	41.4 (0.024)	CIMMYT-5016	42.3 (0.024)
Raj 4079	41.3 (0.024)	FLW 3	41.8 (0.024)
GW 322	40.7 (0.025)	CIMMYT-8055	40.7 (0.025)
CIMMYT-1052	40.7 (0.025)	Raj 4079	39.9 (0.025)
HD 3171	40.0 (0.025)	DPW 621-50	39.7 (0.025)
HI 8759	39.9 (0.025)	CIMMYT-9018	38.8 (0.026)
GW 366	39.8 (0.025)	HI 1418	38.5 (0.026)
K 1006	39.1 (0.026)	HD 2932	37.8 (0.026)
LOK 1	39.0 (0.026)	CIMMYT-5024	37.8 (0.026)
PBW 660	38.7 (0.026)	HD 2967	37.6 (0.027)
CIMMYT-9034	38.5 (0.026)	HD 3171	37.5 (0.027)
IC 566635	38.3 (0.026)	CIMMYT-8040	37.2 (0.027)
CIMMYT-6007	38.1 (0.026)	K 1006	36.7 (0.027)
CIMMYT-5024	37.9 (0.026)	CIMMYT-1048	36.4 (0.027)

DBW 93	37.7 (0.026)	WW-22	36.2 (0.028)
FLW 3	37.7 (0.026)	HD 309	35.5 (0.028)
CIMMYT-1008	37.2 (0.027)	CIMMYT-6052	35.4 (0.028)
SW2 (CHECK)	37.1 (0.027)	PBW 550	35.2 (0.028)
CIMMYT-9048	36.9 (0.027)	CIMMYT-5021	34.8 (0.029)
WW-44	36.6 (0.027)	CIMMYT-5025	34.7 (0.029)
CIMMYT-5019	36.6 (0.027)	CIMMYT-1008	34.7(0.029)
CIMMYT-6052	36.2 (0.028)	CIMMYT-1009	34.6 (0.029)
HI 1418	36.0 (0.028)	WW-41	34.4 (0.029)
CIMMYT-8040	35.7 (0.028)	CIMMYT-9048	34.4 (0.029)
HD 2967	35.5 (0.028)	CIMMYT-6007	34.1 (0.029)
WW-41	35.4 (0.028)	SW1 (CHECK)	33.8 (0.030)
HS 542	35.3 (0.028)	HS 240 (CHECK)	33.7 (0.030)
WW-36	35.2 (0.028)	NHIVT-1508	33.3 (0.030)
VL22	35.2 (0.028)	CIMMYT-9015	33.1 (0.030)
CIMMYT-5021	35.1 (0.028)	SW2 (CHECK)	33.0 (0.030)
DPW 621-50	34.9 (0.029)	VL22	32.1(0.031)
SW1 (CHECK)	33.9 (0.029)	FLW 29	31.8 (0.031)
NHIVT-1501	33.9 (0.029)	CIMMYT-1052	31.7 (0.031)
HS 240 (CHECK)	33.6 (0.030)	CIMMYT-9052	31.0 (0.032)
CIMMYT-9015	33.2 (0.030)	WW-44	30.5(0.033)
HD 309	33.1 (0.030)	WW-37	30.0 (0.033)
CIMMYT-9052	32.7 (0.031)	CIMMYT-9034	29.1 (0.034)
WW-35	32.5 (0.031)	WW-35	27.8 (0.036)
HD 2932	30.9 (0.032)	NHIVT-1501	27.2 (0.037)
CIMMYT-1009	28.9 (0.035)	WW-36	26.3 (0.038)
Mean	39.18	Mean	38.29
Range	28.9-67.4	Range	26.3-56.6
CV (%)	16.85	CV (%)	19.22

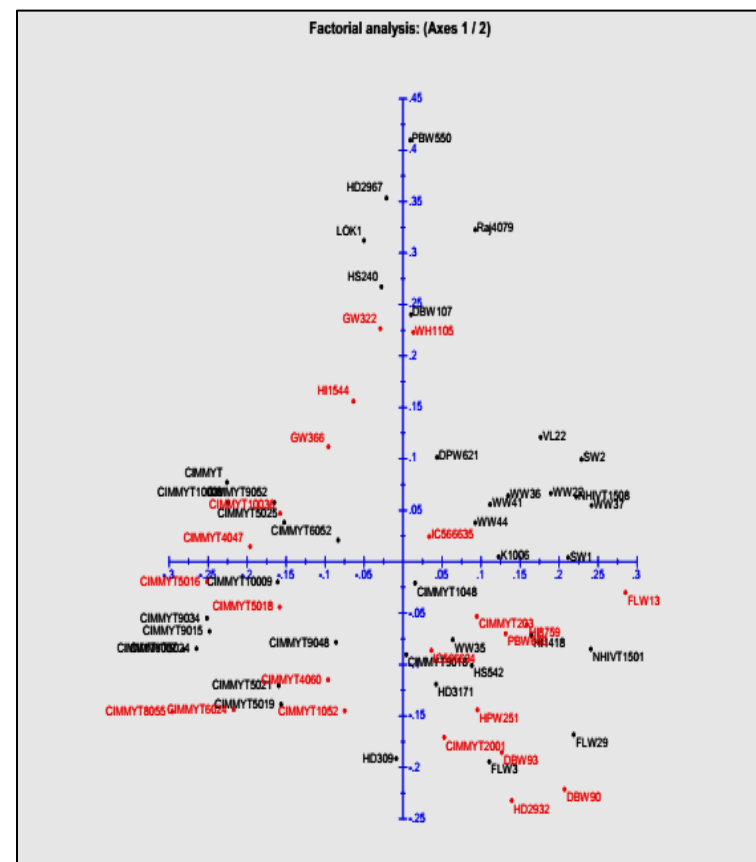
Values in parenthesis are transformed values and genotypes in bold are promising genotypes.

Supplementary Table S2. Summary of AMOVA conducted between two populations based on micronutrient concentrations (low GFe/GZn and high GFe/GZn)

Source of variation	df	SS	MS	Estimated variance	Variation explained (%)
Between Populations	1	83.89	83.89	0.76	1
Within Populations	61	3754.51	61.54	61.54	99
Total	62	3838.41	-	62.31	100



(a)



(b)

Supplementary Fig. S1. Principal Coordinates Analysis (PCoA) of 63 bread wheat genotypes; (a) based on all SSR marker data (trait-specific and randomgenomic SSRs); (b) based on trait-specific SSR marker data (Red ones are high GFe and GZn genotypes while black ones are low GFe and GZn genotypes)