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Supplementary Data

The usefulness of EM-AMMI to study the influence of missing data pattern and application to Polish post-registration winter wheat data

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Table S1. Analysis of variance for AMMI model based on cell means.

Source	SS	df	p [c)]
E [a)]	2683.4	59	
G	79.3	23	
G×E	450.5	1357	
PC 1	125.8	81	0.0000
PC 2	42.4	79	0.0000
PC 3	40.4	77	0.0000
PC 4	34.1	75	0.0000
…	…	…	…
PC 16	6.4	51	0.0010
residual	6.1	49	0.0652
appr. pooled error [b)]	168.5	2125	

a) Environment (E) is the combination of Locations and Years

b) The approximated pooled error was calculated based on original trials (based on yields of all cultivars before choosing a complete subset)

c) p was calculated according Cornelius F_R test (Cornelius 1993)

Table S2. ANOVA table for three-factor mixed model G×L×Y

	df	SS	F	p
G	23	158.6	2.56	0.0033
L	19	2517.2	3.06	0.0016
Y	2	1205.2	3799.17	0.0000
G×L	437	310.2	1.33	0.0002
G×Y	46	123.9	16.98	0.0000
L×Y	38	1644.5	272.84	0.0000
G×L×Y	874	466.9	3.37	0.0000
appr. pooled terror [a)]	2125	337.1		

[a)] The approximated pooled error was calculated based on original trials (based on yields of all cultivars before choosing a complete subset) Genotypes (G) and Locations (L) was treated as fixed factors and Years (Y) as a random factor.

Table S3. ANOVA tables for the RMSPD regarding each number of principal components, considering the proportion of missing cells (MProp) and the pattern of missing cells (MPtype) as factors. The SS was obtained according to type III.

Source of variance	SS	df	MS	F	p
PC = 0					
Intercept	15852896	1	15852896.4	46002011.0	< 0.001
MProp	4734	10	473.4	1373.6	< 0.001
MPtype	65	3	21.7	62.9	< 0.001
MProp×MPtype	16	30	0.5	1.6	0.026
Error	151615	439956	0.3		
PC = 1					
Intercept	15251903	1	15251902.9	17777344.5	< 0.001
MProp	109991	10	10999.1	12820.3	< 0.001
MPtype	3157	3	1052.4	1226.6	< 0.001
MProp×MPtype	8141	30	271.4	316.3	< 0.001
Error	377073	439510	0.9		
PC = 2					
Intercept	37103992	1	37103992.4	1707069.9	< 0.001
MProp	114749	10	11474.9	527.9	< 0.001
MPtype	92745	3	30915.1	1422.3	< 0.001
MProp×MPtype	55079	30	1836.0	84.5	< 0.001
Error	8383311	385697	21.7		
PC = 3					
Intercept	50072286	1	50072286.2	1910252.2	< 0.001
MProp	189536	10	18953.6	723.1	< 0.001
MPtype	164434	3	54811.5	2091.1	< 0.001
MProp×MPtype	108773	30	3625.8	138.3	< 0.001
Error	9924092	378603	26.2		