

Supplementary Table 1 List of fodder maize inbred lines used for selection index

Genotype	Pedigree	Source
UMI 61	Selection from Taiwan DMR 13	TNAU
UMI 112	Selection from YUZP-SC-8	TNAU
UMI 1200	Selection from W2619-3	TNAU
UMI 1201	Selection from W2625-3	TNAU
UMI 1205	Selection from W2620-2	TNAU
N-09-160-2	S-123-160-2-1	TNAU
N-10-86	C 7250-86-4-5	TNAU
N 66	C 5180-66-10-7	TNAU
52021	Selection from CM-212	TNAU
52485	Selection from W3206-2	TNAU
DM 82	UMI 79/UMI 936-C1-7-7-7-82	TNAU
DM 84	UMI 79/UMI 936-C1-7-7-7-84	TNAU
GETM 14	Derivatives from the UMI76/UMI 1220	TNAU
DM 12	UMI 79/UMI 936 C1-101-12	TNAU
DM 12-1	UMI 79/UMI 936 C1-100-12-1	TNAU
DM 12-4	UMI 79/UMI 936 C1-67-12-4	TNAU
DM 12-5	UMI 79/UMI 936 C1-67-12-5	TNAU
DM 12-6	UMI 79/UMI 936 C1-29-12-6	TNAU
DM 74-2	UMI 79/UMI 936 C1-7-7-7-74-2	TNAU
UMI 1210	Selection from W2619-3	TNAU
UMI 1221	Selection from TNAU N 148-1	TNAU
GETM 25	Derivatives from the UMI 1200/UMI 112	TNAU
GETM 26	Derivatives from the UMI 1201/Co BC 1	TNAU
GETM 39	Derivatives from the UMI 71/Co 1	TNAU
GETM 40	Derivatives from the UMI 1220/UMI 76	TNAU
GETM 67	Derivatives from the UMI 129/UMI 1210	TNAU
TNFM 139-1	Line derived from composite cross FDM 14, FDM 36, FDM 35, FDM 34, FDM 25, African Tall	TNAU
African Tall	Line derived from composite cross H-611 C, H-611, H-611 (R)C3, K-III × EC-573 (R12) C3, Ukiri Comp A (F) C5 × Ukiri Comp A (F) C3, Chitedge Comp A and Ilonga Comp)	TNAU

TNAU, Tamil Nadu Agricultural University.



Supplementary Table 2 Principal component analysis based on MGIDI for three seasons

PC	<i>Kharif</i> 2022 (E1)			<i>Rabi</i> 2022 (E2)			Summer 2023 (E3)		
	Eigen value	Variance (%)	Cumulative variance (%)	Eigen value	Variance (%)	Cumulative variance (%)	Eigen value	Variance (%)	Cumulative variance (%)
PC1	6.56	41	41	5.99	37.4	37.4	6	37.5	37.5
PC2	3.04	19	60	2.67	16.7	54.1	2.84	17.7	55.2
PC3	1.54	9.63	69.6	2.03	12.7	66.8	1.68	10.5	65.8
PC4	1.43	8.94	78.6	1.52	9.52	76.3	1.5	9.35	75.1
PC5	0.86	5.36	83.9	0.87	5.42	81.7	1.02	6.38	81.5
PC6	0.72	4.48	88.4	0.68	4.28	86	0.89	5.59	87.1

MGIDI, Multi-trait genotype ideotype distance index.

Supplementary Table 3 MGIDI and MTSI index values of 28 fodder maize inbred lines

Inbreds	<i>Kharif</i> 2022 (E1)	<i>Rabi</i> 2022 (E2)	Summer 2023 (E3)	Across environments
	MGIDI	MGIDI	MGIDI	MTSI
UMI 61	4.39	3.7	4.46	7.99
UMI 112	4.74	4.48	5.33	8.83
UMI 1200	5.16	3.54	4.12	6.84
UMI 1201	4.09	3.21	4.94	6.13
UMI 1205	3.04	4.04	3.75	8.54
N-09-160-2	4.49	3.55	4.59	6.26
N-10-86	5.97	4.24	6.17	9.64
N 66	3.07	4.26	4.32	6.79
52021	5.72	5.46	4.92	8.76
52485	4.85	3.92	5.67	6.74
DM 82	4.83	4.89	4.22	8.42
DM 84	4.36	4.51	4.16	7.8
GETM 14	5.88	4.98	4.25	9.05
DM 12	5.89	4.22	3.81	7.49
DM 12-1	4.43	4.72	3.8	8.65
DM 12-4	5.04	3.23	5.68	7.88
DM 12-5	5.15	4.21	4.13	7.42
DM 12-6	5.23	4.21	3.35	8.64
DM 74-2	4.88	2.46	2.66	8.5
UMI 1210	3.62	2.85	3.8	6.76
UMI 1221	5.06	3.82	4.5	8.54
GETM 25	2.88	2.89	1.96	6.35
GETM 26	4.42	3.47	2.58	7.27
GETM 39	5.13	4.04	3.57	8.76
GETM 40	3.9	4.61	5.23	8.16
GETM 67	4.16	4.54	4.82	7.39
TNFM 139-1	3.07	1.8	3.42	7.58
African Tall	3.88	1.47	3.22	7.57

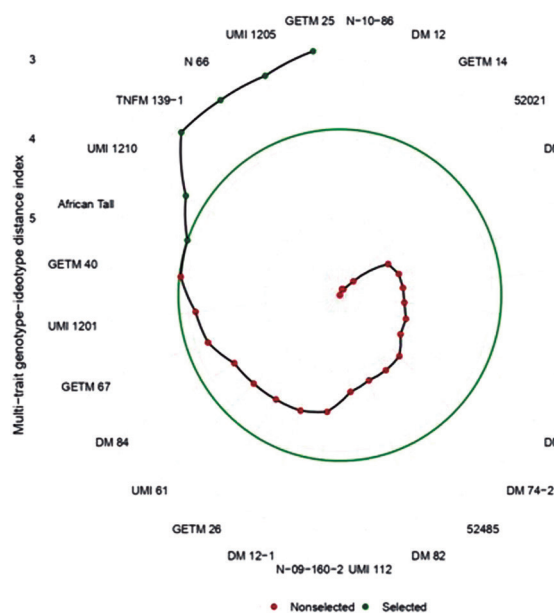
MGIDI, Multi-trait genotype ideotype distance index; MTSI, Multi trait stability index.



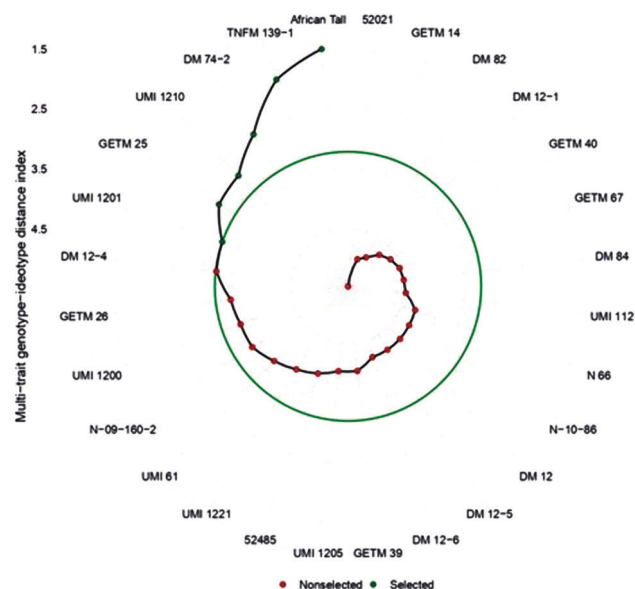
Supplementary Table 4 Eigen values, percent variation and factor loadings based on MTSI

Traits	FA1	FA2	FA3	FA4	FA5	Communality
DFE	-0.028	-0.482	0.789	0.171	-0.028	0.885
CH	-0.029	-0.269	-0.031	-0.668	-0.263	0.589
PH	-0.096	0.149	0.154	-0.762	0.123	0.651
NL	-0.075	-0.943	0.112	-0.098	-0.126	0.934
NN	-0.149	-0.871	0.075	-0.175	-0.123	0.833
LL	-0.111	-0.098	-0.009	0.005	-0.785	0.638
LB	-0.007	-0.111	-0.510	0.356	-0.625	0.790
IL	-0.548	-0.211	-0.069	-0.111	-0.441	0.556
SGR	-0.168	-0.031	0.226	-0.171	-0.782	0.721
LSR	0.542	-0.240	0.057	0.053	0.149	0.379
CP	0.883	0.145	-0.063	-0.072	0.050	0.813
CF	0.640	-0.042	-0.497	-0.131	0.247	0.737
ADF	0.796	0.242	-0.025	0.165	-0.082	0.726
NDF	0.509	-0.436	-0.441	0.036	0.417	0.819
DMY	-0.012	-0.185	-0.244	-0.639	0.001	0.503
GFY	-0.496	-0.174	0.308	-0.347	-0.287	0.574
Eigen value	4.33	2.34	1.77	1.61	1.1	-
Variance	27	14.6	11.1	10.1	6.86	-
Cumulative	27	41.7	52.8	62.8	69.7	-

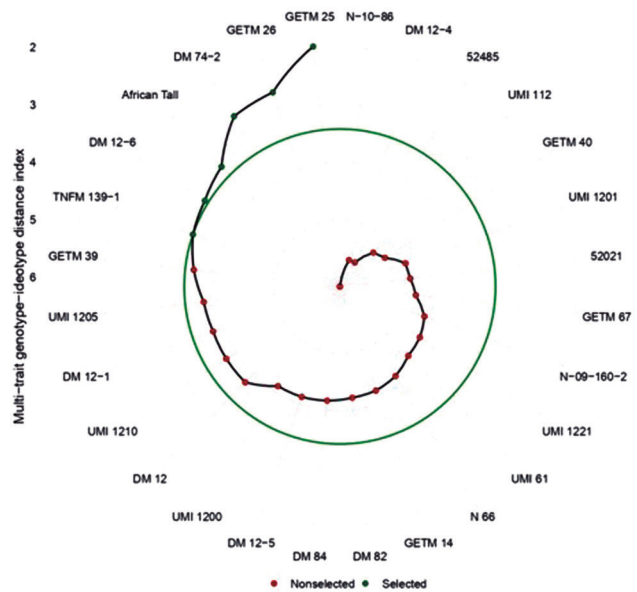
MTSI, Multi Trait Stability Index; FA, Factor analysis; DFE, Days to 50% flowering; CH, Cob placement height; PH, Plant height; NL, Number of leaves; NN, Number of nodes; LL, Leaf length; LB, Leaf breadth; IL, Internode length; SGR, Stem girth; LSR, Leaf stem ratio; CP, Crude protein; CF, Crude fiber; ADF, Acid detergent fiber; NDF, Neutral detergent fiber; DMY, Dry matter yield; GFY, Green fodder yield.



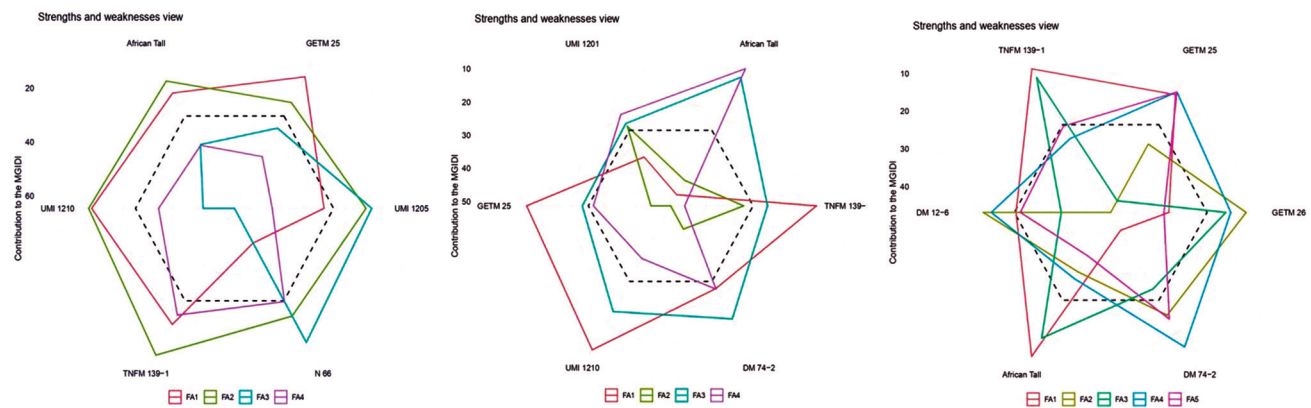
Supplementary Fig. 1 MGIDI index for selection of fodder maize inbreds in E1.
MGIDI, Multi-trait genotype ideotype distance index.



Supplementary Fig. 2 MGIDI index for selection of fodder maize inbreds in E2.
MGIDI, Multi-trait genotype ideotype distance index.



Supplementary Fig. 3 MGIDI index for selection of fodder maize inbreds in E3.
MGIDI, Multi-trait genotype ideotype distance index.



Supplementary Fig. 4 Strength and weakness of selected parents (A) E1; (B) E2; (C) E3.