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Supplimentary

Supplementary Table 1 : Genotyping data of the EST-SSRs on *Moringa oliefera* genotypes

Genotypes	MO13	MO14	MO15	MO16	MO17	MO18	MO19	MO20	MO21	MO22	MO23	MO24	MO25	MO26	MO27	MO28	MO29	MO30	MO31	MO32	MO33	MO34	MO35	MO36	MO37	MO38	MO39	MO40	MO41	MO42	MO43	MO44	MO45	MO46	MO47	MO48
IIHR D-1a	49	103	99	95	53	102	98	95	53	103	97	95	45	100	101	75	50	52	101	94	45	60	96	101	45	99	95	90	28	99	94	94	28	99	94	94
IIHR D-1b	93	118	107	102	93	117	100	109	93	117	115	109	50	114	104	95	89	60	103	100	50	99	100	105	89	113	114	106	44	113	114	96	45	113	106	95
IIHR D-2a	53	102	98	95	53	102	98	92	49	103	87	95	45	100	100	89	25	45	93	82	50	99	98	99	45	100	97	103	28	99	94	91	28	99	87	94
IIHR D-2b	93	117	99	110	93	117	99	94	93	117	134	109	50	114	102	98	44	60	98	97	89	113	105	105	89	113	101	105	44	113	95	106	45	113	94	106
IIHR D-3a	53	64	104	109	53	102	91	93	84	103	98	95	28	99	95	105	44	60	94	101	78	99	99	97	33	99	94	90	28	99	94	85	28	99	95	95
IIHR D-3b	93	118	109	117	93	117	98	110	94	117	99	99	45	114	100	107	50	114	95	105	89	113	100	99	33	113	112	110	45	113	95	89	45	113	119	111
IIHR D-4a	83	103	155	94	49	103	97	93	83	103	99	96	50	100	96	98	28	60	98	101	45	99	100	104	45	99	95	90	28	99	95	99	28	99	101	96
IIHR D-4b	93	118	159	109	93	63	97	124	93	117	100	108	89	114	101	102	45	114	100	106	50	113	108	107	89	114	107	106	44	113	106	105	44	113	107	107
IIHR D-5a	53	103	97	99	53	102	98	92	53	102	97	101	50	100	96	96	28	52	94	81	44	100	88	102	25	100	99	94	28	99	105	90	28	99	94	94
IIHR D-5b	93	118	98	109	93	117	99	95	93	117	99	103	89	114	105	98	44	60	95	105	50	113	94	105	28	105	101	96	45	113	111	103	45	113	115	106
IIHR D-6a	36	103	98	85	49	103	99	85	53	102	98	93	50	61	94	107	28	60	99	90	45	99	96	106	28	100	100	99	28	99	94	95	28	99	98	95
IIHR D-6b	48	118	100	103	94	118	100	93	93	117	99	94	89	106	105	108	44	113	103	112	50	113	105	108	89	114	107	104	44	114	95	106	45	113	102	112
IIHR D-7a	83	103	97	85	53	103	98	85	53	102	97	93	78	61	96	94	28	60	96	99	45	99	95	101	45	100	99	94	28	100	96	95	28	99	99	98
IIHR D-7b	93	110	99	117	94	117	100	93	93	117	97	103	89	114	101	106	45	114	103	121	50	113	109	105	89	114	113	106	45	114	108	106	45	113	101	99
IIHR D-8a	53	103	97	94	53	102	98	92	53	103	98	99	45	53	95	98	28	45	95	109	44	99	92	90	45	100	101	99	28	99	94	94	28	99	94	106
IIHR D-8b	93	118	100	103	94	117	99	94	93	117	102	102	50	61	115	106	44	60	103	115	50	113	110	113	89	114	103	100	45	114	99	103	45	113	98	112
IIHR D-9a	48	103	100	93	49	63	98	93	53	103	97	97	50	60	94	106	44	60	95	105	45	99	99	96	33	100	95	96	28	99	95	104	28	99	96	98
IIHR D-9b	49	118	102	110	93	118	107	103	93	179	99	108	89	114	95	108	45	113	96	107	50	113	101	105	45	113	100	101	45	114	103	106	45	113	100	105
IIHR D-10a	49	102	67	94	49	103	97	97	49	102	97	95	44	99	95	106	28	60	95	89	44	99	95	99	45	99	94	89	28	99	94	89	28	99	99	105
IIHR D-10b	53	117	122	109	93	117	109	101	93	118	100	104	50	113	105	114	44	113	105	102	45	113	99	105	89	113	106	128	45	113	110	106	45	113	101	117
IIHR D-11a	49	103	98	85	49	102	97	94	49	102	97	95	44	60	95	105	44	60	95	98	45	99	93	100	26	99	79	89	28	99	94	83	28	95	101	95
IIHR D-11b	53	117	108	109	93	117	98	85	93	117	100	98	50	114	96	112	50	113	104	104	50	113	108	101	28	113	94	90	44	113	127	119	45	99	105	104
IIHR D-15a	53	102	98	94	53	102	97	95	53	102	97	95	50	60	95	83	44	60	95	96	50	96	95	96	28	100	88	90	28	99	94	90	45	95	94	87
IIHR D-15b	93	103	98	95	93	117	109	101	93	117	98	96	89	99	117	120	50	113	108	98	90	99	100	105	33	113	95	91	45	113	108	112	89	113	107	109
IIHR D-17a	83	103	97	94	54	102	97	93	53	102	97	101	50	99	95	90	28	100	93	95	50	95	94	97	44	100	88	98	28	99	94	90	45	95	94	94
IIHR D-17b	93	117	100	95	93	117	99	95	93	117	99	102	89	113	97	91	45	113	95	113	89	99	95	104	89	113	94	105	45	113	112	106	56	99	104	106
IIHR D-18a	49	102	98	93	54	102	97	90	53	63	97	94	50	99	94	106	28	60	88	84	50	99	100	98	45	99	94	99	28	99	94	95	28	95	94	91
IIHR D-18b	93	109	109	124	93	117	98	94	94	103	110	95	89	114	95	112	44	113	94	108	89	113	111	104	89	113	105	104	45	113	116	110	45	99	104	102
IIHR D-27a	53	102	97	94	54	103	98	95	83	102	98	95	50	100	94	89	28	60	95	100	50	99	102	101	26	99	94	94	28	99	94	94	28	99	94	98
IIHR D-27b	93	109	100	109	94	118	104	99	93	117	99	99	89	114	105	91	45	113	95	101	89	113	102	104	28	113	109	105	44	113	120	106	45	113	99	101
IIHR D-28a	83	103	99	94	53	102	98	86	53	102	98	92	50	100	87	90	28	60	94	106	50	100	98	91	45	100	95	90	28	100	95	95	28	99	94	90
IIHR D-28b	93	117	100	109	94	117	99	119	93	117	104	110	89	114	95	91	44	113	96	107	89	113	105	105	89	114	100	106	44	113	113	104	45	113	103	106
IIHR D-33a	83	102	98	93	53	102	98	104	84	102	99	96	44	99	91	90	28	60	95	101	79	99	95	96	45	99	99	90	28	99	94	99	45	96	95	94
IIHR D-33b	93	117	99	94	93	117	99	104	93	116	102	101	50	113	95	105	44	114	95	104	89	100	97	105	89	113	105	94	45	113	95	104	50	100	112	96
IIHR D-38a	53	103	98	97	53	103	99	101	53	103	98	93	50	100	51	95	28	99	96	100	78	99	95	100	45	99	94	94	28	99	94	95	28	99	101	99
IIHR D-38b	94	118	100	109	93	117	101	103	94	117	99	95	89	114	64	103	44	113	102	106	89	113	103	103	89	114	107	106	45	113	106	106	45	113	102	105
IIHR D-55a	53	103	98	94	53	103	97	97	84	103	98	101	50	99	95	91	45	99	94	82	79	100	103	95	44	99	94	91	28	99	94	98	45	99	95	95
IIHR D-55b	93	117	99	109	93	117	98	104	94	117	105	103	90	113	108	99	50	113	104	106	89	113	105	105	89	113	105	106	44	113	102	110	50	113	106	99
IIHR D-62a	53	102	98	93	53	103	98	103	84	103	98	95	50	99	95	90	28	113	95	88	79	96	95	98	45	99	94	95	45	99	100	99	45	95	94	95
IIHR D-62b	93	117	99	109	93	117	108	104	93	117	99	98	89	113	105	107	45	114	117	117	89	99	108	105	89	113	119	98	50	113	102	102	50	99	106	106
IIHR D-64a	53	103	97	93	53	103	97	93	84	103	98	95	50	60	94	89	50	60	96	99	79	96	95	97	44	99	95	95	44	99	95	91	28	99	97	97
IIHR D-64b	93	117	104	94	93	117	112	102	94	118	103	109	89	174	106	109	89	113	108	103	89	99	98	99	89	113	111	104	50	113	112	106	45	105	104	106
IIHR D-69a	53	103	97	96	53	102	91	94	84	102	99	95	50	60	95	108	50	99	101	104	50	95	94	99	32	99	94	89	44	99	94	105	28	95	95	95
IIHR D-69b	93	117	99	98	93	117	97	103	94	117	103	102	89	100	95	109	89	113	106	106	90	99	107	105	33	113	112	114	45	113	105	113	45	99	98	106
IIHR D-78a	53	103	98	93	53	103	97	95	84	102	97	100	78	99	95	88	28	60	88	91	50	96	95	91	50	99	95	89	28	99	94	89	58	95	100	99
IIHR D-78b	93	117	104	94	93	117	108	109	93	117	99	104	89	100	98	89	44	113	94	105	89	99	99	91	89	113	106	115	44	113	107	106	89	99	101	103
IIHR D-98a	53	103	98	93	53	103	98	105	84	102	98	94	78	99	98	91	45	60	107	105	50	96	95	90	61	99	95	94	33	99	94	106	59	95	95	101
IIHR D-98b	93	117	99	94	93	117	99	111	94	117	99	101	89	114	104	106	50	113	108	106	89	99	99	94	89	114	111	106	45	113	106	112	89	99	103	104
IIHR D-101a	53	103	98	95	53	102	98	99	84	102	90	95	50	100	98	99	45	100	95	94	79	96	95	98	61	99	94	91	33	99	94	95	50	96	95	98
IIHR D-101b	93	117	100	95	93	117	100	117	93	117	97	101	89	114	101	101	50	113	100	106	90	100	103	106	89	113	99	94	44	113	107	115	89	100	99	100
IIHR D-103a	83	103	99	94	53	102	93	98	83	103	89	98	50	100	95	106	50	99	94	90	50	96	101	105	45	100	100	98	28	99	94	95	58	96	94	94
IIHR D-103b	93	118	103	102	93	117	97	102	94	117	98	102	89	113	114	107	89	113	95	99	90	100	102	106	89	114	102	106	45	113	109	105	89	99	108	95
IIHR D-106a	53	97	98	98	84	103	97	95	83	103	97	95	50	100	94	105	50	99	95	95	79	95	103	100	61	99	94	94	45	99	99	96	0	0	0	0
IIHR D-106b	93	99	100	100	93	117	107	109	93	117	99	103	89	114	96	106	90	105	105	106	90	100	103	106	89	113	99	97	50	113	107	105	0	0	0	0
IIHR D-107a	53	102	98	93	83	102	103	102	83	103	98	101	45	100	99	98	44	99	94	99	50	96	97	97	45	99	98	89	28	99	94	98	58	95	87	91
IIHR D-107b	93	117	100	94	93	117	108	105	93	117	102	102	50	114	100	100	50	113	118	106	90	99	103	103	89	113	103	115	45	113	97	105	89	100	108	105
IIHR D-118a	53	102	97	98	53	103	100	95	84	103	97	94	50	45	94	103	44	52	83	96	50	100	98	91	33	60	94	95	50	99	98	94	58	95	95	99
IIHR D-118b	93	117	98	103	94	117	102	109	93	117	100	102	89	60	104	105	50	60	106	105	90	113	99	106	89	99	105	107	89	113	103	106	89	99	98	103
IIHR D-120a	49	103	97	93	53	102	97	86	84	103	98	98	50	99	95	95	45	60	82	82	50	96	95	94	45	60	94	91	33	99	94	94	56	95	94	95
IIHR D-120b	93	116	98	94	93	117	104	94	94	118	99	109	89	113	100	100	50	99	94	90	89	99	100	105	89	99	109	106	45	113	111	96	89	100	114	99
IIHR D-121a	53	102	98	95	53	103	97	93	83	102	97	98	50	100	79	106	45	60	98	96	50	96	95	94	61	99	99	100	44	99	94	92	56	95	94	94
IIHR D-121b	93	117	99	98	93	117	115	95	93	117	99	101	89	113	94	122	50	113	108	104	89	100	99	106	89	113	100	106	45	113	116	104	59	99	108	105
IIHR D-124a	53	103	97	92	49	103	87	93	84	103	99	95	50	99	94	89	45	99	96	93	50	96	89	96	61	100	94	95	33	99	95	90	57	96	100	96
IIHR D-124b	93	117	109	109	93	117	134	95	94	118	100	105	89	113	106	107	51	113	108	111	89	99	95	104	89	113	107	100	44	114	107	106	58	99	103	101

rs	alleles	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	G23	G24
MO13	A/G	R	R	R	R	A	G	A	A	A	R	G	R	R	G	R	R	R	R	R	R	R	G	R	R
MO14	A/G	R	R	G	R	R	R	R	R	R	A	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO15	A/G	R	A	R	A	A	R	A	G	R	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
MO16	A/G	R	R	G	R	R	R	R	R	R	A	A	A	R	R	R	R	R	A	A	A	A	R	A	A
MO17	A/G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	R
MO18	A/G	R	R	R	R	R	R	G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO19	A/G	R	A	A	R	R	R	R	R	A	R	R	R	R	R	R	R	R	R	R	R	R	R	G	R
MO20	A/G	R	A	R	A	A	A	R	R	A	R	A	A	R	G	G	R	G	R	R	R	R	R	G	A
MO21	A/G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO22	A/G	R	R	R	R	R	R	R	R	R	R	R	G	R	R	R	R	R	R	R	R	R	R	R	R
MO23	A/G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO24	A/G	R	R	R	G	A	R	R	R	R	R	G	R	R	R	A	G	R	A	R	G	R	R	G	R
MO25	A/G	R	R	R	R	R	R	R	R	R	R	A	R	R	R	R	R	R	G	R	R	R	R	G	R
MO26	A/G	R	R	R	R	G	G	G	R	G	A	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO27	A/G	G	G	R	R	R	R	A	R	A	R	A	A	R	A	R	R	R	R	A	A	R	R	R	A
MO28	A/G	R	A	G	A	G	A	G	G	G	R	A	G	A	A	R	A	R	R	G	A	R	G	A	R
MO29	A/G	R	A	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO30	A/G	A	A	R	A	R	R	R	R	R	R	R	R	R	R	G	G	G	R	G	R	G	G	G	A
MO31	A/G	G	A	A	A	R	R	A	R	R	R	A	A	A	A	R	R	R	R	G	A	R	A	R	A
MO32	A/G	R	R	G	R	G	G	G	R	R	A	R	R	G	G	G	R	R	G	G	R	R	R	G	R
MO33	A/G	A	R	G	A	A	A	A	A	A	R	R	R	R	R	G	G	G	G	R	R	G	R	R	R
MO34	A/G	A	G	G	G	G	G	G	G	G	R	R	G	G	G	G	G	R	R	R	R	R	R	A	A
MO35	A/G	A	R	A	R	R	R	R	R	R	R	A	G	G	R	R	G	R	A	G	R	R	G	R	R
MO36	A/G	G	G	G	G	G	G	R	G	G	G	G	G	G	G	G	R	R	R	G	A	R	R	R	R
MO37	A/G	R	R	R	R	G	R	A	R	R	R	R	R	R	R	R	R	R	R	G	R	G	R	R	R
MO38	A/G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO39	A/G	R	A	R	G	G	G	R	R	A	A	A	R	R	R	R	R	R	R	R	R	A	G	R	R
MO40	A/G	R	G	R	A	G	G	G	R	A	A	G	G	R	R	R	R	A	R	R	R	A	G	R	R
MO41	A/G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	G	R	G	G	R	G
MO42	A/G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
MO43	A/G	R	A	R	G	A	R	R	R	R	R	R	R	R	R	R	R	G	R	R	R	R	R	A	R
MO44	A/G	A	R	A	R	R	R	G	R	R	R	R	R	R	R	R	G	G	R	G	R	R	R	R	A
MO45	A/G	R	R	R	R	R	R	R	R	R	R	G	R	R	R	R	G	G	R	R	R	R	R	R	G
MO46	A/G	R	R	R	R	R	R	R	R	A	R	A	A	R	R	R	R	A	R	R	R	R	R	R	R
MO47	A/G	R	A	R	R	R	R	R	R	G	R	R	R	R	R	G	R	R	R	R	G	R	R	R	R
MO48	A/G	R	R	R	R	R	R	R	G	R	R	R	R	R	R	R	R	R	R	R	R	R	A	R	A

*A- Parent 1 allele, G- Parent 2 allele, R- Heterozygote

Supplementary Table 2 : Marker association with traits/phenotypes obtained using GAPIT which is a R based software

Phenotypic trait	Marker associated	P-value	maf	nobs	Rsquare of Model without SNP	Rsquare of Model with SNP	FDR Adjusted P-values	effect
Total Phenols	MO15	0.03573	0.125	24	0.140982707	0.360433946	0.897624343	464.6535
FRAP Antioxidant activity mg/ 100 g (FW)	MO15	0.044616	0.125	24	0.154595288	0.35004726	0.541111501	597.0767
Antioxidant activity (DPPH)	MO43	0.042455	0.479167	24	0.234619244	0.415673741	0.58125149	-779.185
	MO17	0.048752	0.479167	24	0.234619244	0.404317985	0.58125149	-1498.18
	MO44	0.049791	0.479167	24	0.234619244	0.402606199	0.58125149	-804.938
H-Ca (%)	MO14	0.026793	0.5	24	0.282297423	0.489032556	0.711103098	-1.25293
I-Mg (%)	MO14	0.00502	0.5	24	0.255153806	0.629863155	0.18070865	-0.2995
	MO32	0.016255	0.3125	24	0.255153806	0.51408568	0.292591477	-0.17173
J-Fe (ppm)	MO44	0.02087	0.479167	24	0.148140159	0.418486233	0.751311657	80.89135
K-Mn (ppm)	MO44	0.012707	0.479167	24	-0.004897636	0.375359358	0.457452611	155.8797
	MO31	0.025774	0.3125	24	-0.004897636	0.289071245	0.463938949	129.215
L-Zn (ppm)	MO44	0.020141	0.479167	24	0.110294847	0.396432858	0.637277842	41.26446
	MO31	0.035404	0.3125	24	0.110294847	0.338490817	0.637277842	34.70698
M-Cu (ppm)	MO44	0.022929	0.479167	24	0.138232753	0.402111716	0.630725522	8.143296
	MO24	0.03504	0.458333	24	0.138232753	0.360253594	0.630725522	6.990332