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Supplementary Table 1 List of the 150 oat genotypes collected from different locations and used for agro-morphological and micronutrient analysis in the present study.

S. N.	Accession number	Location	S. N.	Accession number	Location	S. N.	Accession number	Location	S. N.	Accession number	Location
1	IG02152	USDA, NSGR, Aberdeen, USA	19	IG02144	USDA, NSGR, Aberdeen, USA	37	IG0265	USDA, NSGR, Aberdeen, USA	55	IG0265	USDA, NSGR, Aberdeen, USA
2	IG02156	USDA, NSGR, Aberdeen, USA	20	IG02138	USDA, NSGR, Aberdeen, USA	38	IG0294	USDA, NSGR, Aberdeen, USA	56	IG0263	USDA, NSGR, Aberdeen, USA
3	IG02155	USDA, NSGR, Aberdeen, USA	21	IG02139	USDA, NSGR, Aberdeen, USA	39	IG0295	USDA, NSGR, Aberdeen, USA	57	IG0274	USDA, NSGR, Aberdeen, USA
4	IG02157	USDA, NSGR, Aberdeen, USA	22	IG02136	USDA, NSGR, Aberdeen, USA	40	IG0298	USDA, NSGR, Aberdeen, USA	58	IG0272	USDA, NSGR, Aberdeen, USA
5	IG02158	USDA, NSGR, Aberdeen, USA	23	IG02135	USDA, NSGR, Aberdeen, USA	41	IG03470	USDA, NSGR, Aberdeen, USA	59	IG0262	USDA, NSGR, Aberdeen, USA
6	IG02161	USDA, NSGR, Aberdeen, USA	24	IG02133	USDA, NSGR, Aberdeen, USA	42	IG03460	USDA, NSGR, Aberdeen, USA	60	IG0268	USDA, NSGR, Aberdeen, USA
7	IG02154	USDA, NSGR, Aberdeen, USA	25	IG0289	USDA, NSGR, Aberdeen, USA	43	IG03469	USDA, NSGR, Aberdeen, USA	61	IG0271	USDA, NSGR, Aberdeen, USA
8	IG02153	USDA, NSGR, Aberdeen, USA	26	IG0287	USDA, NSGR, Aberdeen, USA	44	IG02182	USDA, NSGR, Aberdeen, USA	62	IG0266	USDA, NSGR, Aberdeen, USA
9	IG02151	USDA, NSGR, Aberdeen, USA	27	IG0291	USDA, NSGR, Aberdeen, USA	45	IG02181	USDA, NSGR, Aberdeen, USA	63	IG0264	USDA, NSGR, Aberdeen, USA

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		Aberdeen, USA			Aberdeen, USA			Aberdeen, USA			Aberdeen, USA
10	IG02149	USDA, NSGR, Aberdeen, USA	28	IG0280	USDA, NSGR, Aberdeen, USA	46	IG02180	USDA, NSGR, Aberdeen, USA	64	IG0259	USDA, NSGR, Aberdeen, USA
11	IG02150	USDA, NSGR, Aberdeen, USA	29	IG0277	USDA, NSGR, Aberdeen, USA	47	IG03273	Sweden	65	IG03212	USDA, NSGR, Aberdeen, USA
12	IG02149	USDA, NSGR, Aberdeen, USA	30	IG0279	USDA, NSGR, Aberdeen, USA	48	IG03272	Sweden	66	IG02131	USDA, NSGR, Aberdeen, USA
13	IG02148	USDA, NSGR, Aberdeen, USA	31	IG0281	USDA, NSGR, Aberdeen, USA	49	IG03278	Sweden	67	IG02122	USDA, NSGR, Aberdeen, USA
14	IG02146	USDA, NSGR, Aberdeen, USA	32	IG0283	USDA, NSGR, Aberdeen, USA	50	IG03271	Sweden	68	IG02130	USDA, NSGR, Aberdeen, USA
15	IG02141	USDA, NSGR, Aberdeen, USA	33	IG0285	USDA, NSGR, Aberdeen, USA	51	IG03233	USDA, NSGR, Aberdeen, USA	69	IG02123	USDA, NSGR, Aberdeen, USA
16	IG02140	USDA, NSGR, Aberdeen, USA	34	IG0276	USDA, NSGR, Aberdeen, USA	52	IG03255	USDA, NSGR, Aberdeen, USA	70	IG02125	USDA, NSGR, Aberdeen, USA
17	IG02142	USDA, NSGR, Aberdeen, USA	35	IG0273	USDA, NSGR, Aberdeen, USA	53	IG03232	USDA, NSGR, Aberdeen, USA	71	IG02126	USDA, NSGR, Aberdeen, USA
18	IG02143	USDA, NSGR, Aberdeen, USA	36	IG0270	USDA, NSGR, Aberdeen, USA	54	IG0275	USDA, NSGR, Aberdeen, USA	72	IG02127	USDA, NSGR, Aberdeen, USA
73	IG02132	USDA, NSGR, Aberdeen, USA	94	IG03465	USDA, NSGR, Aberdeen, USA	115	IG03213	USDA, NSGR, Aberdeen, USA	136	IG03457	USDA, NSGR, Aberdeen, USA

74	IG02128	USDA, NSGR, Aberdeen, USA	95	IG03461	USDA, NSGR, Aberdeen, USA	116	IG03209	USDA, NSGR, Aberdeen, USA	137	IG03458	USDA, NSGR, Aberdeen, USA
75	IG02121	USDA, NSGR, Aberdeen, USA	96	IG03467	USDA, NSGR, Aberdeen, USA	117	IG03210	USDA, NSGR, Aberdeen, USA	138	IG02459	USDA, NSGR, Aberdeen, USA
76	IG02129	USDA, NSGR, Aberdeen, USA	97	IG03460	USDA, NSGR, Aberdeen, USA	118	IG03211	USDA, NSGR, Aberdeen, USA	139	IG02162	USDA, NSGR, Aberdeen, USA
77	IG02113	USDA, NSGR, Aberdeen, USA	98	IG02176	USDA, NSGR, Aberdeen, USA	119	IG03215	USDA, NSGR, Aberdeen, USA	140	IG02165	USDA, NSGR, Aberdeen, USA
78	IG02114	USDA, NSGR, Aberdeen, USA	99	IG03277	Sweden	120	IG03216	USDA, NSGR, Aberdeen, USA	141	IG02171	USDA, NSGR, Aberdeen, USA
79	IG02115	USDA, NSGR, Aberdeen, USA	100	IG03254	USDA, NSGR, Aberdeen, USA	121	IG03217	USDA, NSGR, Aberdeen, USA	142	IG02170	USDA, NSGR, Aberdeen, USA
80	IG02116	USDA, NSGR, Aberdeen, USA	101	IG03231	USDA, NSGR, Aberdeen, USA	122	IG03218	USDA, NSGR, Aberdeen, USA	143	IG02169	USDA, NSGR, Aberdeen, USA
81	IG02117	USDA, NSGR, Aberdeen, USA	102	IG03260	USDA, NSGR, Aberdeen, USA	123	IG03214	USDA, NSGR, Aberdeen, USA	144	IG02172	USDA, NSGR, Aberdeen, USA
82	IG02118	USDA, NSGR, Aberdeen, USA	103	IG03259	USDA, NSGR, Aberdeen, USA	124	IG03219	USDA, NSGR, Aberdeen, USA	145	IG02174	USDA, NSGR, Aberdeen, USA
83	IG02119	USDA, NSGR, Aberdeen, USA	104	IG03257	USDA, NSGR, Aberdeen, USA	125	IG03226	USDA, NSGR, Aberdeen, USA	146	IG02175	USDA, NSGR, Aberdeen, USA
84	IG02120	USDA, NSGR, Aberdeen, USA	105	IG03256	USDA, NSGR, Aberdeen, USA	126	IG03220	USDA, NSGR, Aberdeen, USA	147	JHO-822	IGFRI, India

		Aberdeen, USA			Aberdeen, USA			Aberdeen, USA			
85	IG02102	USDA, NSGR, Aberdeen, USA	106	IG02177	USDA, NSGR, Aberdeen, USA	127	IG03203	USDA, NSGR, Aberdeen, USA	148	JHO-851	IGFRI, India
86	IG02103	USDA, NSGR, Aberdeen, USA	107	IG0297	USDA, NSGR, Aberdeen, USA	128	IG03205	USDA, NSGR, Aberdeen, USA	149	JHO- 2000-4	IGFRI, India
87	IG02106	USDA, NSGR, Aberdeen, USA	108	IG0299	USDA, NSGR, Aberdeen, USA	129	IG03206	USDA, NSGR, Aberdeen, USA	150	Kent	Australia
88	IG02104	USDA, NSGR, Aberdeen, USA	109	IG02100	USDA, NSGR, Aberdeen, USA	130	IG03275	Sweden			
89	IG02105	USDA, NSGR, Aberdeen, USA	110	IG0293	USDA, NSGR, Aberdeen, USA	131	IG03207	USDA, NSGR, Aberdeen, USA			
90	IG02109	USDA, NSGR, Aberdeen, USA	111	IG02110	USDA, NSGR, Aberdeen, USA	132	IG03208	USDA, NSGR, Aberdeen, USA			
91	IG02107	USDA, NSGR, Aberdeen, USA	112	IG02101	USDA, NSGR, Aberdeen, USA	133	IG03276	Sweden			
92	IG02108	USDA, NSGR, Aberdeen, USA	113	IG0296	USDA, NSGR, Aberdeen, USA	134	IG03458	USDA, NSGR, Aberdeen, USA			
93	IG02111	USDA, NSGR, Aberdeen, USA	114	IG02124	USDA, NSGR, Aberdeen, USA	135	IG03456	USDA, NSGR, Aberdeen, USA			

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Supplementary Table 2 Eigenvalues, standard deviation, proportion of variance, cumulative variance and eigenvectors of thirteen important traits (including four forage micronutrient traits) in 150 oat genotypes

Character	PC1	PC2	PC3	PC4	PC5
Zn content	0.040	-0.268	0.254	-0.449	-0.625
Cu content	-0.036	-0.310	-0.647	-0.073	-0.249
Fe content	0.059	0.165	0.013	0.737	-0.248
Mn content	-0.124	-0.036	0.601	-0.086	0.150
Plant height	-0.242	-0.282	-0.165	0.461	0.167
Number of leaves	-0.315	-0.635	0.195	-0.031	0.242
Leaf length	-0.374	0.094	-0.543	-0.115	-0.274
Leaf width	-0.265	-0.696	-0.084	-0.099	0.241
Tiller number	-0.284	-0.404	-0.158	0.210	-0.185
Grain number	-0.696	-0.095	0.093	0.028	-0.007
Test weight	0.230	0.193	-0.544	-0.280	0.489
Green fodder yield	-0.832	0.378	0.021	-0.094	0.012
Dry matter yield	-0.726	0.472	0.000	-0.081	0.045
Standard deviation	1.49	1.32	1.24	1.06	1.01
Eigenvalue	2.23	1.75	1.54	1.13	1.03
Proportion of variance (%)	17.13	13.44	11.87	8.71	7.94
Cumulative proportion (%)	17.13	30.58	42.44	51.15	59.09