

Supplemental Table 1. List of 272 Vietnamese amaranth accessions used in the current study

No	Code	Accession number	Local name	Collection area	Scientific name based on <i>matK</i> barcode phylogeny
1	VA001	3700	Rau den do	Northeast	<i>Amaranthus tricolor</i> L.
2	VA002	3701	Rau den tim	Northeast	Hybrid complex
3	VA003	3702	Rau den tam the	Northeast	<i>Amaranthus tricolor</i> L.
4	VA004	3764	Rau den do	Northeast	<i>Amaranthus tricolor</i> L.
5	VA005	3848	Rau den xanh	Northeast	Hybrid complex
6	VA006	3879	Rau den	North Central Coast	<i>Amaranthus tricolor</i> L.
7	VA007	5484	Rau den xanh	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
8	VA008	5485	Peec ngan sai	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
9	VA009	5486	Rau den	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
10	VA010	5487	Rau den do	Northeast	<i>Amaranthus tricolor</i> L.
11	VA011	5489	Den đò	Northwest	<i>Amaranthus tricolor</i> L.
12	VA012	5490	Rau den ca	Northwest	<i>Amaranthus tricolor</i> L.
13	VA013	5491	Rau den ta dang 1	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
14	VA014	5492	Rau den trang dang 1	Northwest	<i>Amaranthus tricolor</i> L.
15	VA015	5493	Rau den mao ga dang 1	Northwest	<i>Amaranthus tricolor</i> L.
16	VA016	5496	Rau den do dang 1	Northeast	<i>Amaranthus tricolor</i> L.
17	VA017	5497	Rau den	Southeast	<i>Amaranthus tricolor</i> L.
18	VA018	5499	Rau den dai	Central Highlands	Hybrid complex
19	VA019	5500	Rau den dai	Central Highlands	<i>Amaranthus tricolor</i> L.
20	VA020	5501	Rau den	Southeast	<i>Amaranthus tricolor</i> L.
21	VA021	5502	Rau den	Southwest	<i>Amaranthus tricolor</i> L.
22	VA022	5503	Rau den	Southwest	<i>Amaranthus tricolor</i> L.
23	VA023	5504	Rau den dai	Southwest	<i>Amaranthus tricolor</i> L.
24	VA024	5505	Rau den do	Southwest	<i>Amaranthus tricolor</i> L.
25	VA025	5506	Rau den	Southwest	<i>Amaranthus tricolor</i> L.
26	VA026	5507	Rau den	Southwest	<i>Amaranthus tricolor</i> L.
27	VA027	5508	Den do	Southeast	<i>Amaranthus tricolor</i> L.
28	VA028	5509	Den trang	Southeast	<i>Amaranthus tricolor</i> L.
29	VA029	5510	Den trang	Southeast	<i>Amaranthus tricolor</i> L.
30	VA030	5511	Den tia	Southwest	<i>Amaranthus tricolor</i> L.
31	VA031	5512	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
32	VA032	6543	Rau den Trung Quoc	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
33	VA033	6544	Rau den	Southwest	<i>Amaranthus tricolor</i> L.
34	VA034	6615	Rau den	Central Highlands	<i>Amaranthus tricolor</i> L.
35	VA035	6616	Rau den trang	Central Highlands	<i>Amaranthus tricolor</i> L.
36	VA036	6617	Den do	Central Highlands	<i>Amaranthus tricolor</i> L.
37	VA037	6618	Den tia	Central Highlands	Hybrid complex
38	VA038	6619	Den trang	Northeast	Hybrid complex
39	VA039	6620	Rau den	Northeast	<i>Amaranthus tricolor</i> L.
40	VA040	6753	Rau den trang	Northeast	<i>Amaranthus viridis</i> L.
41	VA041	6882	Rau den do	North Central Coast	<i>Amaranthus tricolor</i> L.
42	VA042	6883	Rau den do	North Central Coast	<i>Amaranthus tricolor</i> L.
43	VA043	6884	Rau den trang	North Central Coast	<i>Amaranthus tricolor</i> L.
44	VA044	6885	Rau den tia	North Central Coast	<i>Amaranthus tricolor</i> L.
45	VA045	7961	Rau gien tia	North Central Coast	Hybrid complex
46	VA046	7962	Pac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
47	VA047	7963	Phac hom	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
48	VA048	8999	Rau den	Northeast	Hybrid complex
49	VA049	9000	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
50	VA050	9001	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.

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51	VA051	9002	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
52	VA052	9003	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
53	VA053	9004	Rau den ta dang 2	Northwest	<i>Amaranthus tricolor</i> L.
54	VA054	9005	Rau den trang dang 2	Northwest	<i>Amaranthus tricolor</i> L.
55	VA055	9006	Rau den mao ga dang 2	Northwest	<i>Amaranthus tricolor</i> L.
56	VA056	9007	Rau den mao ga dang 3	Northwest	<i>Amaranthus tricolor</i> L.
57	VA057	9008	Rau den mao ga dang 4	Northwest	<i>Amaranthus tricolor</i> L.
58	VA058	9009	Rau den mao ga dang 5	Northwest	<i>Amaranthus tricolor</i> L.
59	VA059	9010	Rau den mao ga dang 6	Northwest	<i>Amaranthus tricolor</i> L.
60	VA060	9011	Rau den do dang 2	Northeast	<i>Amaranthus tricolor</i> L.
61	VA061	9012	Rau den	Central Highlands	<i>Amaranthus dubius</i> Mart. ex Thell
62	VA062	9013	Phac hom nang	Northwest	<i>Amaranthus tricolor</i> L.
63	VA063	9014	Den tia	North Central Coast	<i>Amaranthus tricolor</i> L.
64	VA064	9015	Gien do	Red River Delta	<i>Amaranthus tricolor</i> L.
65	VA065	9806	Rau gien trang	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
66	VA066	12512	Rau den	Central Highlands	Hybrid complex
67	VA067	12518	Rau gien	Southwest	<i>Amaranthus tricolor</i> L.
68	VA068	12861	Phac hom	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
69	VA069	13712	Den tia	Central Highlands	Hybrid complex
70	VA070	13713	Rau gien do	Northeast	<i>Amaranthus tricolor</i> L.
71	VA071	13714	Tac trenh	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
72	VA072	15333	Tac trenh cang	Northwest	<i>Amaranthus tricolor</i> L.
73	VA073	15334	Tac trenh thia	Northwest	<i>Amaranthus tricolor</i> L.
74	VA074	15338	Rau den trang	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
75	VA075	15339	Pac hom	Northwest	<i>Amaranthus blitum</i> L.
76	VA076	15341	Phac hom	Northwest	<i>Amaranthus tricolor</i> L.
77	VA077	15342	Pac hom	Northwest	<i>Amaranthus blitum</i> L.
78	VA078	15343	Phac hom	Northwest	Hybrid complex
79	VA079	15344	Phac hum khao	Northwest	<i>Amaranthus blitum</i> L.
80	VA080	15345	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
81	VA081	15346	Xu ntu	Northwest	Hybrid complex
82	VA082	15347	Xu ntu	Northwest	Hybrid complex
83	VA083	15348	Ru gien	Northwest	<i>Amaranthus tricolor</i> L.
84	VA084	15349	Cha ni go chu	Northwest	Hybrid complex
85	VA085	15350	Song lu	Northwest	<i>Amaranthus blitum</i> L.
86	VA086	15351	Phac hom	Northwest	Hybrid complex
87	VA087	15352	Xu tu	Northwest	Hybrid complex
88	VA088	15353	Chun tu	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
89	VA089	15354	Phác hòm danh	Northwest	<i>Amaranthus tricolor</i> L.
90	VA090	15355	Xung tu	Northwest	<i>Amaranthus tricolor</i> L.
91	VA091	15356	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
92	VA092	15357	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
93	VA093	15358	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
94	VA094	15359	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
95	VA095	15361	Su ntu	Northeast	Hybrid complex
96	VA096	15363	Thanh my la	Northeast	Hybrid complex
97	VA097	15364	Pac hom	Northeast	<i>Amaranthus blitum</i> L.
98	VA098	15365	Pac hom	Northeast	<i>Amaranthus blitum</i> L.
99	VA099	15366	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
100	VA100	16697	Den trang	Central Highlands	<i>Amaranthus tricolor</i> L.

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101	VA101	16698	Den do	Central Highlands	Hybrid complex
102	VA102	16700	Phac khum	Northwest	Hybrid complex
103	VA103	16701	Rau den	Northwest	<i>Amaranthus dubius</i> Mart. ex Thell
104	VA104	16702	Phac hum	Northwest	Hybrid complex
105	VA105	16703	Xu tu	Northeast	Hybrid complex
106	VA106	16704	Su du	Northeast	Hybrid complex
107	VA107	16705	Xuong tu	Northeast	Hybrid complex
108	VA108	16706	Thanh li	Northeast	Hybrid complex
109	VA109	16707	Su tu	Northeast	Hybrid complex
110	VA110	16708	Rau gien do	Northeast	<i>Amaranthus tricolor</i> L.
111	VA111	16709	Den do	South Central Coast	<i>Amaranthus tricolor</i> L.
112	VA112	16710	Den trang	South Central Coast	Hybrid complex
113	VA113	16711	Larom	South Central Coast	Hybrid complex
114	VA114	16712	Ro hum dom	Central Highlands	Hybrid complex
115	VA115	16713	Ro hum bo	Central Highlands	Hybrid complex
116	VA116	16714	Rohum dom po he	Central Highlands	Hybrid complex
117	VA117	16715	Rohum dom	Central Highlands	Hybrid complex
118	VA118	16716	Rohum bo	Central Highlands	Hybrid complex
119	VA119	16717	Rohum pro he	Central Highlands	Hybrid complex
120	VA120	16718	Rau den	Central Highlands	<i>Amaranthus tricolor</i> L.
121	VA121	16719	Ro hum brah	Central Highlands	Hybrid complex
122	VA122	20460	Soongs tu	Northeast	Hybrid complex
123	VA123	20462	Xe mi say	Northwest	Hybrid complex
124	VA124	20464	Sung tu	Northwest	Hybrid complex
125	VA125	20465	Rau huan	Northwest	Hybrid complex
126	VA126	20467	Thung tu	Northeast	Hybrid complex
127	VA127	20468	Phec gien	Northeast	Hybrid complex
128	VA128	20472	Phec hom	Northeast	<i>Amaranthus tricolor</i> L.
129	VA129	20473	Pe dup	South Central Coast	<i>Amaranthus viridis</i> L.
130	VA130	20475	Rau gien	Northeast	<i>Amaranthus tricolor</i> L.
131	VA131	20476	Rau gien	South Central Coast	<i>Amaranthus tricolor</i> L.
132	VA132	20478	Rau gien	Northeast	<i>Amaranthus tricolor</i> L.
133	VA133	20479	Rau gien	Northeast	<i>Amaranthus tricolor</i> L.
134	VA134	20488	Rau den la do	South Central Coast	<i>Amaranthus tricolor</i> L.
135	VA135	20489	Den do	South Central Coast	<i>Amaranthus tricolor</i> L.
136	VA137	20492	Song tu	Northeast	Hybrid complex
137	VA138	22078	Nong lu	Northwest	Hybrid complex
138	VA139	22079	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
139	VA140	22080	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
140	VA141	22081	Hang sai	Northeast	Hybrid complex
141	VA142	22082	Rhum	Central Highlands	Hybrid complex
142	VA143	22083	Rau den trang	Southwest	<i>Amaranthus dubius</i> Mart. ex Thell
143	VA144	22084	Pe rup	South Central Coast	<i>Amaranthus tricolor</i> L.
144	VA145	22094	Phac hom	Northwest	<i>Amaranthus tricolor</i> L.
145	VA146	22095	Rau gien	Northwest	<i>Amaranthus tricolor</i> L.
146	VA147	22096	Giay hen thi	Northeast	Hybrid complex
147	VA148	T00813	Rau den	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
148	VA149	T08318	Rhum	Central Highlands	Hybrid complex
149	VA150	T08323	Rau den	Central Highlands	<i>Amaranthus dubius</i> Mart. ex Thell
150	VA151	T08324	Den trang	Central Highlands	Hybrid complex

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151	VA152	T09381	Gay hen	Northeast	Hybrid complex
152	VA153	T09677	Phyac hom	Northeast	Hybrid complex
153	VA154	T09725	Rau gien	Northeast	Hybrid complex
154	VA155	T09726	Rau thun tum	Northeast	Hybrid complex
155	VA156	T09779	Song du	Northeast	Hybrid complex
156	VA158	T09797	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
157	VA159	T09826	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
158	VA160	T09827	Rau den	Red River Delta	<i>Amaranthus tricolor</i> L.
159	VA161	T12249	Rau khong dau	Northeast	Hybrid complex
160	VA162	T12251	Kla dun	Northwest	<i>Amaranthus tricolor</i> L.
161	VA163	T12252	Phac cat	Northwest	<i>Amaranthus viridis</i> L.
162	VA164	T12257	Xe mi say	Northwest	Hybrid complex
163	VA165	T12259	Thung tu	Northeast	Hybrid complex
164	VA166	T12262	Phac hom	Northeast	Hybrid complex
165	VA167	T12266	Gien com	Northeast	<i>Amaranthus viridis</i> L.
166	VA168	T12270	Gien mat nguyet	Northeast	<i>Amaranthus tricolor</i> L.
167	VA170	T15696	Rau gien	Northeast	<i>Amaranthus tricolor</i> L.
168	VA171	T15706	Rau gien	Northeast	<i>Amaranthus tricolor</i> L.
169	VA172	T17582	Rau gien com	Northeast	<i>Amaranthus blitum</i> L.
170	VA173	T21421	Rau gien	Southwest	<i>Amaranthus tricolor</i> L.
171	VA174	T21422	Rau gien	Southwest	<i>Amaranthus dubius</i> Mart. ex Thell
172	VA175	T21424	Rau den	Southwest	<i>Amaranthus tricolor</i> L.
173	VA176	T21425	Hlahnhem	Central Highlands	<i>Amaranthus tricolor</i> L.
174	VA177	T21426	Rau den	Central Highlands	<i>Amaranthus tricolor</i> L.
175	VA178	5498	Rau den	Central Highlands	Hybrid complex
176	VA179 ^a	16699	Rau gien	Unknown	Hybrid complex
177	VA180	20469	Gien 10	Northeast	<i>Amaranthus tricolor</i> L.
178	VA181	20470	Gien tia	Northeast	<i>Amaranthus tricolor</i> L.
179	VA182	20481	Den com	Northwest	<i>Amaranthus blitum</i> L.
180	VA183	20482	Rau den do	Central Highlands	<i>Amaranthus tricolor</i> L.
181	VA184	20483	Rau den tieu	South Central Coast	<i>Amaranthus tricolor</i> L.
182	VA185	20484	Rau den do	South Central Coast	<i>Amaranthus tricolor</i> L.
183	VA186	20485	Rau den do	South Central Coast	<i>Amaranthus tricolor</i> L.
184	VA187	20486	Rau den la xanh	South Central Coast	<i>Amaranthus tricolor</i> L.
185	VA188	20487	Rau den la do	South Central Coast	<i>Amaranthus tricolor</i> L.
186	VA189	20493	Sien mi Sai	Northeast	Hybrid complex
187	VA190	22085	Pac hom lanh	Northwest	<i>Amaranthus tricolor</i> L.
188	VA191	22086	Den trang la tron, nho	North Central Coast	<i>Amaranthus tricolor</i> L.
189	VA192	22087	Den trang la ngon, to dai	North Central Coast	<i>Amaranthus tricolor</i> L.
190	VA193	22088	Den do dam la tron	North Central Coast	<i>Amaranthus tricolor</i> L.
191	VA194	22089	Den tím thân đỏ	North Central Coast	<i>Amaranthus tricolor</i> L.
192	VA195	22090	Den tím thân tím	North Central Coast	<i>Amaranthus tricolor</i> L.
193	VA196	22091	Den tía	North Central Coast	<i>Amaranthus tricolor</i> L.
194	VA197	22093	Den kim	North Central Coast	<i>Amaranthus tricolor</i> L.
195	VA198	22094	Rau gien	Northeast	<i>Amaranthus tricolor</i> L.
196	VA199	22096	Giay hen thi	Northeast	<i>Amaranthus tricolor</i> L.
197	VA200	T05901	Phac hom	Northwest	<i>Amaranthus blitum</i> L.
198	VA201	T08318	Rhum	Central Highlands	<i>Amaranthus dubius</i> Mart. ex Thell
199	VA202	T08952	Phac lam	Northeast	Hybrid complex
200	VA203	T09675	Quy go	Northeast	Hybrid complex

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201	VA204	T09676	Quy go pu	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
202	VA205	T12239	Gien xanh	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
203	VA206	T12261	Phec hom	Northeast	<i>Amaranthus tricolor</i> L.
204	VA207	T12263	Xi xanh	Northeast	Hybrid complex
205	VA208	T12264	Xi xanh	Northeast	Hybrid complex
206	VA209	T12265	Sac ham	Northeast	Hybrid complex
207	VA210	T12268	Gien gai trang	Northeast	Hybrid complex
208	VA211	T15687	Phec hom	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
209	VA212	T15689	Phac hom	Northeast	Hybrid complex
210	VA213	T15690	Vi ky	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
211	VA214	T15691	Hla tre	Central Highlands	<i>Amaranthus tricolor</i> L.
212	VA215	T15692	Lah Hrum	Central Highlands	Hybrid complex
213	VA216	T15699	Rau gien	Central Highlands	<i>Amaranthus tricolor</i> L.
214	VA217	T15702	Gien com	South Central Coast	Hybrid complex
215	VA218	T15703	Rau gien com	South Central Coast	Hybrid complex
216	VA219	T15705	Gien com	South Central Coast	<i>Amaranthus tricolor</i> L.
217	VA220	T17583	Rau den do	Northeast	<i>Amaranthus tricolor</i> L.
218	VA221	T17584	Den do	Northwest	<i>Amaranthus tricolor</i> L.
219	VA222	T17589	Rau den do	South Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
220	VA223	T17596	Rau den la xanh	South Central Coast	<i>Amaranthus tricolor</i> L.
221	VA224	T17597	Den 3 mau	South Central Coast	<i>Amaranthus tricolor</i> L.
222	VA225	T17598	Den trang	South Central Coast	Hybrid complex
223	VA226 ^a	T17858	Den com	Unknown	<i>Amaranthus viridis</i> L.
224	VA227 ^a	T17859	Rau den trang	Unknown	Hybrid complex
225	VA228 ^a	T17860	Rau den	Unknown	Hybrid complex
226	VA229	T20471	Den do la nhon, dai	North Central Coast	<i>Amaranthus tricolor</i> L.
227	VA230	T20475	Den do	North Central Coast	<i>Amaranthus tricolor</i> L.
228	VA231	T20481	Phac hom	Northwest	<i>Amaranthus tricolor</i> L.
229	VA232	T20485	Pac ham	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
230	VA233	T20486	Pac ham	Northeast	<i>Amaranthus tricolor</i> L.
231	VA234	T20487	Rau gien	Northwest	<i>Amaranthus tricolor</i> L.
232	VA235	T20490	Ro ham	Central Highlands	<i>Amaranthus tricolor</i> L.
233	VA236	T20494	Rau gien	Northeast	Hybrid complex
234	VA237	T20495	Tau le	Northeast	Hybrid complex
235	VA238	T20496	Phec hom dinh	Northeast	<i>Amaranthus tricolor</i> L.
236	VA239	T20536	Ray hieen	Northeast	<i>Amaranthus dubius</i> Mart. ex Thell
237	VA240	T21423	Rau gien	Southwest	<i>Amaranthus tricolor</i> L.
238	VA241	T17601	Den Mui	South Central Coast	<i>Amaranthus blitum</i> L.
239	VA242	T17605	Ro sun tu	Northwest	Hybrid complex
240	VA243	T23028	Pac ham	Northeast	<i>Amaranthus tricolor</i> L.
241	VA244	2016.01	Rau den ta	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
242	VA245	2016.02	Rau gien gai	North Central Coast	Hybrid complex
243	VA246	2016.03	Rau gien gai	North Central Coast	Hybrid complex
244	VA247	2016.04	Rau gien gai	North Central Coast	Hybrid complex
245	VA248	2016.05	Pha hom	North Central Coast	Hybrid complex
246	VA249	2016.13	Lai Le xi	North Central Coast	<i>Amaranthus tricolor</i> L.
247	VA251	2016.16	Lai Le pua	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
248	VA252	2016.24	Phac hom le	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
249	VA253	2016.25	Phac hom danh	North Central Coast	<i>Amaranthus tricolor</i> L.
250	VA254	2016.26	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell

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251	VA255	2016.34	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
252	VA256	2016.36	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
253	VA257	2016.37	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
254	VA258	2016.38	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
255	VA259	2016.39	Phac hom	North Central Coast	Hybrid complex
256	VA260	2016.40	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
257	VA261	2016.41	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
258	VA263	2016.45	Sau trenh	North Central Coast	<i>Amaranthus viridis</i> L.
259	VA264	2016.46	Rau gien canh	North Central Coast	Hybrid complex
260	VA265	2016.47	Sau trenh	North Central Coast	Hybrid complex
261	VA266	2016.49	Sau trenh kai	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
262	VA269	2016.52	Rau gien xanh	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
263	VA270	2016.53	Rau gien gai	North Central Coast	Hybrid complex
264	VA271	2016.54	Rau gien do	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
265	VA272	2016.56	Phac hom	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
266	VA273	2016.66	Phac hom deng	North Central Coast	<i>Amaranthus tricolor</i> L.
267	VA275	2016.68	Phac hom khau	North Central Coast	<i>Amaranthus dubius</i> Mart. ex Thell
268	VA276	2016.72	Phac hom nam deng	North Central Coast	<i>Amaranthus tricolor</i> L.
269	VA277	2016.76	Clom	North Central Coast	Hybrid complex
270	VA278	2016.77	Rau gien xanh co gai	North Central Coast	Hybrid complex
271	VA279	T20457	Phac hom deng	Unknown	Hybrid complex
272	VA280	T20463	Phac hom hao	Unknown	Hybrid complex

^aThese accessions were imported from the World Vegetable Center.

Supplemental Table 2. List of 182 WA amaranth accessions using in the current study

No	Code	Name	Scientific name	Seed distributor	Country of collection
1	WA001	Irokoina	<i>Amaranthus tricolor</i> L.	Seed company	na
2	WA002	Biam	<i>Amaranthus tricolor</i> L.	Seed company	na
3	WA003	Green Pointed Leaf	<i>Amaranthus tricolor</i> L.	Seed company	na
4	WA004	Red Stripe Leaf	<i>Amaranthus tricolor</i> L.	Seed company	na
5	WA005	White Leaf	<i>Amaranthus tricolor</i> L.	Seed company	na
6	WA006	Tender Leaf	<i>Amaranthus tricolor</i> L.	Seed company	na
7	WA007	Green Round Leaf	<i>Amaranthus tricolor</i> L.	Seed company	na
8	WA008	Southern Red	<i>Amaranthus tricolor</i> L.	Seed company	na
9	WA009	Asia Red	<i>Amaranthus tricolor</i> L.	Seed company	na
10	WA010	New Aztec	<i>Amaranthus hypochondriacus</i> L.	NARO Genebank	Japan
11	WA011	Ames-2051	<i>Amaranthus tricolor</i> L.	USDA	Indonesia
12	WA012	Ames-2091	<i>Amaranthus tricolor</i> L.	USDA	Nepal
13	WA013	Ames-5102	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
14	WA014	Ames-5368	<i>Amaranthus tricolor</i> L.	USDA	Bangladesh
15	WA015	Ames-29034	<i>Amaranthus tricolor</i> L.	USDA	Malaysia
16	WA016	PI-349553	<i>Amaranthus tricolor</i> L.	USDA	Papua New Guinea
17	WA017	PI-419057	<i>Amaranthus tricolor</i> L.	USDA	China
18	WA018	PI-599683	<i>Amaranthus tricolor</i> L.	USDA	India
19	WA019	PI-604669	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
20	WA020	PI-607446	<i>Amaranthus tricolor</i> L.	USDA	Thailand
21	WA021	PI-608761	<i>Amaranthus tricolor</i> L.	USDA	India
22	WA022	I 942	<i>Amaranthus tricolor</i> L.	NARO Genebank	Nepal
23	WA023	Y-3233(1)D	<i>Amaranthus tricolor</i> L.	NARO Genebank	Nepal
24	WA024	Y-3233(2)D	<i>Amaranthus tricolor</i> L.	NARO Genebank	Nepal
25	WA025	Y-3245(1)D	<i>Amaranthus tricolor</i> L.	NARO Genebank	Nepal
26	WA026	Y-3245(2)D	<i>Amaranthus tricolor</i> L.	NARO Genebank	Nepal
27	WA027	Amaranth	<i>Amaranthus tricolor</i> L.	NARO Genebank	na
28	WA028	PI538322	<i>Amaranthus hypochondriacus</i> L.	USDA	USA
29	WA031	PI419121	<i>Amaranthus tricolor</i> L.	USDA	China
30	WA036	PI603896	<i>Amaranthus tricolor</i> L.	USDA	USA
31	WA039	PI604670	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
32	WA040	Ames34159	<i>Amaranthus tricolor</i> L.	USDA	India
33	WA041	PI604668	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
34	WA043	PI277269	<i>Amaranthus tricolor</i> L.	USDA	India
35	WA044	PI603897	<i>Amaranthus tricolor</i> L.	USDA	USA
36	WA045	PI462128	<i>Amaranthus tricolor</i> L.	USDA	India
37	WA046	PI277267	<i>Amaranthus tricolor</i> L.	USDA	India
38	WA047	Ames2214	<i>Amaranthus tricolor</i> L.	USDA	USA
39	WA048	Ames29505	<i>Amaranthus tricolor</i> L.	USDA	Brazil
40	WA049	Ames29504	<i>Amaranthus tricolor</i> L.	USDA	Brazil
41	WA050	PI462127	<i>Amaranthus tricolor</i> L.	USDA	India
42	WA055	PI636179	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
43	WA056	Ames25153	<i>Amaranthus tricolor</i> L.	USDA	USA
44	WA057	Ames25152	<i>Amaranthus tricolor</i> L.	USDA	USS
45	WA059	PI667172	<i>Amaranthus tricolor</i> L.	USDA	India
46	WA060	Ames2103	<i>Amaranthus tricolor</i> L.	USDA	India
47	WA061	PI632237	<i>Amaranthus tricolor</i> L.	USDA	USA
48	WA062	Ames15328	<i>Amaranthus tricolor</i> L.	USDA	USA
49	WA063	Ames15330	<i>Amaranthus tricolor</i> L.	USDA	China
50	WA064	Ames29035	<i>Amaranthus tricolor</i> L.	USDA	India

No	Code	Name	Scientific name	Seed distributor	Country of collection
51	WA068	Ames5311	<i>Amaranthus tricolor</i> L.	USDA	India
52	WA069	PI666331	<i>Amaranthus tricolor</i> L.	USDA	India
53	WA070	Ames26230	<i>Amaranthus tricolor</i> L.	USDA	China
54	WA071	Ames26229	<i>Amaranthus tricolor</i> L.	USDA	China
55	WA072	Ames26228	<i>Amaranthus tricolor</i> L.	USDA	China
56	WA073	Ames26226	<i>Amaranthus tricolor</i> L.	USDA	China
57	WA074	Ames26225	<i>Amaranthus tricolor</i> L.	USDA	China
58	WA075	Ames26223	<i>Amaranthus tricolor</i> L.	USDA	China
59	WA076	Ames26221	<i>Amaranthus tricolor</i> L.	USDA	China
60	WA077	Ames26220	<i>Amaranthus tricolor</i> L.	USDA	China
61	WA078	Ames26219	<i>Amaranthus tricolor</i> L.	USDA	China
62	WA079	Ames26218	<i>Amaranthus tricolor</i> L.	USDA	China
63	WA080	Ames26217	<i>Amaranthus tricolor</i> L.	USDA	China
64	WA081	Ames26216	<i>Amaranthus tricolor</i> L.	USDA	China
65	WA082	Ames26215	<i>Amaranthus tricolor</i> L.	USDA	China
66	WA083	Ames26214	<i>Amaranthus tricolor</i> L.	USDA	China
67	WA084	Ames26213	<i>Amaranthus tricolor</i> L.	USDA	China
68	WA085	Ames26212	<i>Amaranthus tricolor</i> L.	USDA	China
69	WA086	Ames26211	<i>Amaranthus tricolor</i> L.	USDA	China
70	WA087	Ames26210	<i>Amaranthus tricolor</i> L.	USDA	China
71	WA089	Ames26209	<i>Amaranthus tricolor</i> L.	USDA	China
72	WA090	Ames26232	<i>Amaranthus tricolor</i> L.	USDA	China
73	WA091	Ames26227	<i>Amaranthus tricolor</i> L.	USDA	China
74	WA092	Ames26222	<i>Amaranthus tricolor</i> L.	USDA	China
75	WA093	Ames26208	<i>Amaranthus tricolor</i> L.	USDA	China
76	WA094	PI619252	<i>Amaranthus tricolor</i> L.	USDA	India
77	WA099	PI603899	<i>Amaranthus tricolor</i> L.	USDA	USA
78	WA101	NSL6100	<i>Amaranthus tricolor</i> L.	USDA	USA
79	WA102	Ames5303	<i>Amaranthus tricolor</i> L.	USDA	USA
80	WA112	PI669847	<i>Amaranthus tricolor</i> L.	USDA	India
81	WA116	Ames18049	<i>Amaranthus tricolor</i> L.	USDA	Nepal
82	WA117	PI566899	<i>Amaranthus tricolor</i> L.	USDA	India
83	WA118	PI527321	<i>Amaranthus tricolor</i> L.	USDA	China
84	WA119	PI478310	<i>Amaranthus tricolor</i> L.	USDA	China
85	WA120	PI462129	<i>Amaranthus tricolor</i> L.	USDA	India
86	WA121	PI462126	<i>Amaranthus tricolor</i> L.	USDA	India
87	WA123	PI277268	<i>Amaranthus tricolor</i> L.	USDA	India
88	WA124	PI214036	<i>Amaranthus tricolor</i> L.	USDA	India
89	WA125	Ames5354	<i>Amaranthus tricolor</i> L.	USDA	Madagascar
90	WA126	Ames5317	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
91	WA127	PI667171	<i>Amaranthus tricolor</i> L.	USDA	India
92	WA129	Ames5139	<i>Amaranthus tricolor</i> L.	USDA	USA
93	WA130	PI674261	<i>Amaranthus tricolor</i> L.	USDA	India
94	WA131	Ames5134	<i>Amaranthus tricolor</i> L.	USDA	USA
95	WA132	Ames5128	<i>Amaranthus tricolor</i> L.	USDA	USA
96	WA133	Ames5126	<i>Amaranthus tricolor</i> L.	USDA	USA
97	WA134	Ames5118	<i>Amaranthus tricolor</i> L.	USDA	Puerto Rico
98	WA135	Ames5117	<i>Amaranthus tricolor</i> L.	USDA	Puerto Rico
99	WA136	Ames5113	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
100	WA137	Ames5111	<i>Amaranthus tricolor</i> L.	USDA	Papua New Guinea

No	Code	Name	Scientific name	Seed distributor	Country of collection
101	WA138	Ames5110	<i>Amaranthus tricolor</i> L.	USDA	West Africa
102	WA139	Ames5101	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
103	WA140	Ames5100	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
104	WA141	Ames5099	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
105	WA142	Ames2230	<i>Amaranthus tricolor</i> L.	USDA	India
106	WA143	Ames2229	<i>Amaranthus tricolor</i> L.	USDA	India
107	WA144	Ames2228	<i>Amaranthus tricolor</i> L.	USDA	India
108	WA145	Ames2227	<i>Amaranthus tricolor</i> L.	USDA	India
109	WA146	Ames2226	<i>Amaranthus tricolor</i> L.	USDA	India
110	WA147	Ames2225	<i>Amaranthus tricolor</i> L.	USDA	India
111	WA148	Ames2224	<i>Amaranthus tricolor</i> L.	USDA	India
112	WA149	Ames2223	<i>Amaranthus tricolor</i> L.	USDA	India
113	WA150	Ames2222	<i>Amaranthus tricolor</i> L.	USDA	India
114	WA151	Ames2221	<i>Amaranthus tricolor</i> L.	USDA	India
115	WA152	Ames2209	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
116	WA153	PI674260	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
117	WA154	Ames2207	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
118	WA155	Ames2205	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
119	WA156	Ames2204	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
120	WA157	Ames2203	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
121	WA158	Ames2202	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
122	WA159	Ames2199	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
123	WA160	Ames2198	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
124	WA161	Ames2197	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
125	WA162	Ames2196	<i>Amaranthus tricolor</i> L.	USDA	Hong Kong
126	WA163	Ames2149	<i>Amaranthus tricolor</i> L.	USDA	India
127	WA164	Ames2148	<i>Amaranthus tricolor</i> L.	USDA	India
128	WA165	Ames2147	<i>Amaranthus tricolor</i> L.	USDA	India
129	WA166	Ames2146	<i>Amaranthus tricolor</i> L.	USDA	India
130	WA167	Ames2145	<i>Amaranthus tricolor</i> L.	USDA	India
131	WA168	Ames2143	<i>Amaranthus tricolor</i> L.	USDA	India
132	WA169	Ames2142	<i>Amaranthus tricolor</i> L.	USDA	India
133	WA170	Ames2140	<i>Amaranthus tricolor</i> L.	USDA	India
134	WA171	Ames2139	<i>Amaranthus tricolor</i> L.	USDA	India
135	WA172	Ames2138	<i>Amaranthus tricolor</i> L.	USDA	India
136	WA173	Ames2135	<i>Amaranthus tricolor</i> L.	USDA	India
137	WA174	Ames2134	<i>Amaranthus tricolor</i> L.	USDA	India
138	WA175	Ames2132	<i>Amaranthus tricolor</i> L.	USDA	India
139	WA176	Ames2131	<i>Amaranthus tricolor</i> L.	USDA	India
140	WA177	Ames2130	<i>Amaranthus tricolor</i> L.	USDA	India
141	WA178	Ames2129	<i>Amaranthus tricolor</i> L.	USDA	India
142	WA179	Ames2128	<i>Amaranthus tricolor</i> L.	USDA	India
143	WA180	Ames2127	<i>Amaranthus tricolor</i> L.	USDA	India
144	WA181	Ames2126	<i>Amaranthus tricolor</i> L.	USDA	India
145	WA182	Ames2125	<i>Amaranthus tricolor</i> L.	USDA	India
146	WA183	Ames2124	<i>Amaranthus tricolor</i> L.	USDA	India
147	WA184	Ames2123	<i>Amaranthus tricolor</i> L.	USDA	India
148	WA185	Ames2122	<i>Amaranthus tricolor</i> L.	USDA	India
149	WA186	Ames2121	<i>Amaranthus tricolor</i> L.	USDA	India
150	WA187	Ames2120	<i>Amaranthus tricolor</i> L.	USDA	India

No	Code	Name	Scientific name	Seed distributor	Country of collection
151	WA188	Ames2119	<i>Amaranthus tricolor</i> L.	USDA	India
152	WA189	Ames2118	<i>Amaranthus tricolor</i> L.	USDA	India
153	WA190	Ames2117	<i>Amaranthus tricolor</i> L.	USDA	India
154	WA191	Ames2116	<i>Amaranthus tricolor</i> L.	USDA	India
155	WA192	Ames2114	<i>Amaranthus tricolor</i> L.	USDA	India
156	WA193	Ames2113	<i>Amaranthus tricolor</i> L.	USDA	India
157	WA194	Ames2112	<i>Amaranthus tricolor</i> L.	USDA	India
158	WA195	Ames2110	<i>Amaranthus tricolor</i> L.	USDA	India
159	WA196	Ames2109	<i>Amaranthus tricolor</i> L.	USDA	India
160	WA197	Ames2108	<i>Amaranthus tricolor</i> L.	USDA	India
161	WA198	Ames2107	<i>Amaranthus tricolor</i> L.	USDA	India
162	WA199	Ames2106	<i>Amaranthus tricolor</i> L.	USDA	India
163	WA200	Ames2105	<i>Amaranthus tricolor</i> L.	USDA	India
164	WA201	Ames2104	<i>Amaranthus tricolor</i> L.	USDA	India
165	WA202	Ames2102	<i>Amaranthus tricolor</i> L.	USDA	India
166	WA203	Ames2101	<i>Amaranthus tricolor</i> L.	USDA	India
167	WA204	Ames2100	<i>Amaranthus tricolor</i> L.	USDA	India
168	WA206	Ames2040	<i>Amaranthus tricolor</i> L.	USDA	Malaysia
169	WA207	Ames2039	<i>Amaranthus tricolor</i> L.	USDA	Thailand
170	WA208	Ames2029	<i>Amaranthus tricolor</i> L.	USDA	China
171	WA209	Ames2024	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
172	WA210	Ames2017	<i>Amaranthus tricolor</i> L.	USDA	China
173	WA211	Ames1998	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
174	WA212	Ames1993	<i>Amaranthus tricolor</i> L.	USDA	Taiwan
175	WA213	Ames1983	<i>Amaranthus tricolor</i> L.	USDA	India
176	WA214	Ames1982	<i>Amaranthus tricolor</i> L.	USDA	India
177	WA215	Ames1980	<i>Amaranthus tricolor</i> L.	USDA	Zaire
178	WA217	PI337611	<i>Amaranthus hypochondriacus</i> L.	USDA	Uganda
179	WA221	Ames2141	<i>Amaranthus tricolor</i> L.	USDA	India
180	WA222	PI636187	<i>Amaranthus hypochondriacus</i> L.	USDA	India
181	WA223	Ames5689	<i>Amaranthus hypochondriacus</i> L.	USDA	Brazil
182	WA224	PI667174	<i>Amaranthus hypochondriacus</i> L.	USDA	Zimbabwe

na, not available.

Supplemental Table 3. SSR markers developed from the sequence data of *A. tricolor*

Marker	Forward primer sequence	Reverse primer sequence	Repeat motif	Size (bp)
TAM001	ACCTCTCTCAGAAAGCCGTG	AAGCGAACCAGAAAAGTGCAG	(AAAT)8	319
TAM002	ATGTGGTTAAGGCCTGAGGG	CCAACACCATCATAGAGTCCAC	(AAAT)6	204
TAM003	GGGAGGTTTAAGGGAGTGGG	ACCCTTCTTTCAACCCACC	(AAT)6	209
TAM004	AAATAGTGGAGGGCTCGGAC	CTCGTAACGGGTGCAACTTC	(AAT)7	122
TAM005	AATGGGTTAGGGCGGGTATC	CAGCTTAACACTGCGGCTAC	(AT)8	213
TAM006	TGCATGCCAAGTCCGAATTC	GCTCAGCTTGTGTCGACTC	(AAT)7	408
TAM007	ATCTGACCGTGGCTGATACC	ACGATGAGTATGGGCCCTTC	(AT)7	395
TAM008	TCTAGCAGTCACCGGTTAGC	CAGGTTTACGCTGGCAGAAG	(AAT)6	399
TAM009	CACGTACACTGTAGCTTGCG	TTGATGGTGCTCCCTACGTC	(ATC)6	390
TAM010	TTGTTTGGCACTGTATCGCC	GGGATAGGTAGTTGGAGGCG	(AAT)6	229
TAM011	AACGGCGCTATAAGTTGCAG	GTGCAAGCAGAGGGAAACAG	(ATC)6	288
TAM012	GGCTCGCCATTTACTCATG	ACCTAGATCTGCGTTCGGTC	(AAT)6	212
TAM013	CCGAGGGAAACACGTCTTTG	CCGCAGCAAATAAGGGGAAGG	(AT)7	380
TAM014	AAATGCGAGCAGTTCAGTCG	CACATGTGCAGAGGTTTGGG	(AAT)8	399
TAM015	TAAAGCCCGCATGATTCGTG	CGTTTGGGAATACGAGCACC	(AAG)7	192
TAM016	AACCGTGGGAAATGCTTTGG	CACGTTCTGTTACTTCCCAGC	(AT)7	417
TAM017	GTGATTCCGCGTTCATCTG	CAGAGTCCAAAACCCGATGC	(AT)8	316
TAM018	TTTATGCGCCAAACTCCGAC	AGAGGGAAGATGCCATGTCC	(AT)9	402
TAM019	GACGCTTGGCTCTTGTTC	GGGTGCTCAGCTTGTTC	(AAT)7	314
TAM020	GCAACGTGACCCAGAACATC	TCCGTCTTAACCATGGCC	(AAC)7	365
TAM021	TGGGTATAGTTCGCCACACC	ACACCCTTCTCCCTTCC	(ATC)7	430
TAM022	TCGCACTGATTCAACGGTTG	AGCCCATCTCCATAAGCAG	(AC)8	447
TAM023	GCGCACACCATCTGTAGTG	GGCGTCTCTAGCATAGTC	(ATC)6	264
TAM024	TGCGTCTTTGTGATTGTCCG	ACGCGACAAGATATCCTCCC	(ATC)6	450
TAM025	CCGATTAAGAATGGCGGCC	ATGTCCGTATCCTGTGTCCG	(AAG)8	408
TAM026	CAAGGCCAACACCAGCTATG	AGTATGAGGGTACGTGCTGC	(AGG)7	362
TAM027	ACTCACCCACACCATCTTCC	AATTGTTAGCACGAGTCGCC	(ATC)8	341
TAM028	CCCATGTGCATCAATCGACC	CACCTCCTTCAACAATGGCC	(AGG)6	262
TAM029	CTCCATCTCTCTTGTCCCG	TTGCGAGGCCTTTAAAGCAG	(AT)8	435
TAM030	TACCGTCACATCCGTCGTAC	AGTTGCGCAAAGAGTTCGTC	(AAT)9	440