

Plant		Amaranth		519	Primary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Plant: time of beginning of emergence of inflorescence	Block	Observation	date		Observed at inflorescence emergence stage: 50 % of plants ear over 1 cm
2	Plant: time of flowering	Block	Observation	date		Observed at flowering stage: 40 to 50 % of plants begin to bloom (checked by the existence of anther and pollen)
3	Plant: time of maturity	Block	Observation	date		Observed at mature stage: 50 % of plants produce mature seeds
4	Stem: color	Block	Observation	3:Green 4:Yellow 5:Pink 6:Red 7:Purple		Observed at full flowering stage
5	Leaf blade: color	Block	Observation	1:Light green 3:Medium green 5:Dark green 7:Red		Observed at full flowering stage
6	Inflorescence: color	Block	Observation	3:Yellow 4:Green 5:Pink 6:Red 7:Purple 8:Brown		Observed at full flowering stage
7	Inflorescence: type	Block	Observation	1:Amarantiform 9:Glomerulate		Observed at full flowering stage
8	Inflorescence: shape	Block	Observation	1:Drooping 3:Spreading 5:Upright 7:Other		Observed at mature stage
9	Inflorescence: length	10 plants	Measurement	cm (integer)		Inflorescence length from top to flag leaf in main stem at mature stage
10	Plant: length	10 plants	Measurement	cm (integer)		Measured length of plant from base to top at mature stage
11	Seed: color	Block	Observation	1:White 3:Yellow 5:Pink 7:Brown 9:Black		Observed at mature stage

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1	Cotyledon: intensity of reddish coloration	Block	Observation	1:Absent 3:Weak 5:Medium 7:Strong		Observed within 3 to 6 days after emergence
2	Hypocotyl: intensity of reddish coloration	Block	Observation	1:Absent 3:Weak 5:Medium 7:Strong		Observed within 3 to 6 days after emergence
3	Plant: time of harvest for vegetable	Block	Observation	date		(Leafy amaranth) Observed at harvest stage: plant height reaches approximately 25 cm
4	Young leaf: length	10 plants	Measurement	cm (round to the 1st decimal place)		Measured on the young plant with 6 to 8 leaves
5	Young leaf: width	10 plants	Measurement	cm (round to the 1st decimal place)		Measured on the young plant with 6 to 8 leaves
6	Young leaf: ratio length/width	10 plants	Measurement	3:Small 5:Medium 7:Large		Measured on the young plant with 6 to 8 leaves
7	Young leaf: position of widest point	Block	Observation	3:In middle towards base 5:Moderately towards base 7:Strongly towards base		Observed on the young plant with 6 to 8 leaves
8	Young leaf: prominence of veins	Block	Observation	3:Weak 5:Medium 7:Strong		Observed on the young plant with 6 to 8 leaves
9	Young leaf: main color on upper side	Block	Observation	1:Light green 3:Medium green 5:Dark green 7:Red 9:Purple		Observed on the young plant with 6 to 8 leaves
10	Young leaf: distribution of secondary color on upper side	Block	Observation	3:Colored basal area 5:Central blotch 7:Colored margin and veins		Observed on the young plant with 6 to 8 leaves
11	Young leaf: color on the lower side	Block	Observation	3:Green 5:Red 7:Purple		Observed on the young plant with 6 to 8 leaves
12	Leaf: margin	Block	Observation	1:Entire 9:Sinate		Observed at vegetative stage, just before inflorescence emergence

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13	Stem: color of stripes	Block	Observation	1:Absent 3:Light green 5:Red 7:Purple		Observed at full flowering stage
14	Petiole: intensity of reddish coloration	Block	Observation	1:Absent 3:Weak 5:Medium 7:Strong		Observed at full flowering stage
15	Leaf blade: presence of blotch	Block	Observation	1:Absent 9:Present		Observed at full flowering stage
16	Leaf blade: color of blotch	Block	Observation	1:Green 3:Silvery 5:Red 7:Purple		Observed at full flowering stage
17	Leaf blade: distribution of blotch	Block	Observation	1:Chimaera 2:Vein 3:Center 4:Margin 5:V-shaped 6:Entire 7:Amorphous		Observed at full flowering stage
18	Inflorescence: attitude	Block	Observation	1:Upright 3:Weakly recurved 5:Moderately recurved 7:Strongly recurved		Observed at full flowering stage
19	Inflorescence: length of bract relative to utricle	Block	Observation	3:Shorter 5:Equal 7:Longer		Observed at mature stage
20	Plant: number of branches per main stem	10 plants	Measurement	Number per plant (round to the 1st decimal place)		Number of first lateral branches (over 30 cm length with leaves and flowers) on main stem. Measured at mature stage
21	Stem: size	10 plants	Measurement	mm (round to the 1st decimal place)		Measured size of stem on the base at mature stage
22	Seed: shape	Block	Observation	1:Ellipsoid 9:Discoid		Observed on dry seeds at harvest time
23	Seed: perisperm type	10 grains	Measurement	1:Non-glutinous 9:Glutinous		Observed by reaction to potassium iodide solution
24	Seed: weight per 1000 seeds	Block	Measurement	g (round to the 1st decimal place)		Calculated by measuring the 100 seeds at harvest time

Plant		Amaranth		519	Secondary essential character		
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks	
1	Lodging tolerance	Block	Observation	3:Weak	5:Medium	7:Strong	Observed at mature stage
2	Insect resistance	Block	Observation	3:Weak	5:Medium	7:Strong	Observed through a cultivation period (record insect name as far as you know)
3	Mosaic disease resistance	Block	Observation	3:Weak	5:Medium	7:Strong	Extent of mosaic-like symptoms on leaf surface. Observed through a period of time
4	Bacterial wilt resistance	Block	Observation	3:Weak	5:Medium	7:Strong	Observed at early growth stage
5	Stem rot resistance	Block	Observation	3:Weak	5:Medium	7:Strong	Observed until vegetative stage, just before inflorescence emergence

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1	Cold resistance for vegetable	Block	Observation	3:Weak 5:Medium 7:Strong		(Leafy amaranth) Cold tolerance is evaluated by seed germination and seedling growth tests under low temperature
2	Hot resistance for vegetable	Block	Observation	3:Weak 5:Medium 7:Strong		(Leafy amaranth) Heat tolerance is evaluated by seedling growth test under high temperature
3	Viviparity	Block	Observation	3:High 5:Medium 7:Low		Observed at harvest time

Plant		Amaranth		519	Tertiary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Seed yield	Block	Measurement	kg/a (round to the 1st decimal place)		Weight of natural dried seed per unit ares (1 are)
2	Glossiness of grain	Block	Observation	1:Glossy 9:Powdery		Observed by transillumination survey method (Glossy: transmissive, Powdery: non-transmissive)

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1	GBSSI genotype		Measurement	1:Functional 9:Non-functional		Determined by genotyping
2	Amylose content in grains		Measurement	% (round to the 1st decimal place)		Measured by autoanalyzer, etc.
3	Ascorbic acid content		Measurement	mg/100g f.w. (round to the 1st decimal place)		Measured by High-performance liquid chromatography (HPLC), reflectometer (such as RQflex), etc.
4	Oxalic acid content		Measurement	mg/g d.w. (round to the 1st decimal place)		Measured by High-performance liquid chromatography (HPLC) , etc.
5	Rutin content		Measurement	mg/g d.w. (round to the 1st decimal place)		Measured by High-performance liquid chromatography (HPLC) , etc.