Plant	Sweet potato	431	Primary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Plant type	Block	Observation	1:Erect 2:Nearly erect 3:Semi-erect 4:Slightly semi-erect 5:Intermediate 6:Slightly spreading 7:Semi-spreading 8:Nearly spreading 9:Spreading	Plant type 50-60 days after transplanting (intermediate: Kou-kei 14, Beniazuma)
2	Twining	Block	Observation	1:Non-twining 2:Very low 3:Low 4:Slightly low 5:Moderate 6:Slightly high 7:High 8:Very high 9:Extremely high	Twining of vines 80-90 days after transplanting
3	Natural flowering ability	Block	Observation	1:None 2:Very low 3:Low 4:Slightly low 5:Moderate 6:Slightly profuse 7:Profuse 8:Very profuse 9:Extremely profuse	Flowering habit under natural conditions
4	Vine pigmentation	5 plants	Observation	1:Absent 2:Very pale 3:Pale 4:Slightly pale 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark	Anthocyanin pigmentation present in the 10th vine internode from top besides the green color 50-60 days after transplanting
5	Vine node pigmentation	5 plants	Observation	1:Absent 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	Anthocyanin pigmentation present in the 10th vine node from top besides the green color 50-60 days after transplanting
6	Mature leaf shape	5 plants	Observation	1:Heart-shaped 2:Toothed heart-shaped 3:Triangular 4:Toothed-triangular 5:Slightly three lobed 6:Three lobed with teeth 7:Deeply three lobed 8:Five to seven lobed 9:Multi (>7) lobed	Shape of the 10th leaf from top 50-60 days after transplanting
7	Immature leaf color	5 plants	Observation	1:Pale green 2:Green 3:Dark green 4:Yellowish green 5:Pale brown 6:Brown 7:Pale purple 8:Purple 9:Dark purple	Uppermost fully expanded leaf color 50-60 days after transplanting
8	Abaxial leaf vein	5 plants	Observation	1:Absent 2:Very pale 3:Pale 4:Slightly pale 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark	Anthocyanin pigmentation present in the lower surface of the 10th leaf from top 50-60 days after transplanting
9	Leaf nectary pigmentation	5 plants	Observation	1:Absent 2:Very pale 3:Pale 4:Slightly pale 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark	Anthocyanin pigmentation around the nectary present in the base of the lower surface of the 10th leaf from top 50-60 days after transplanting

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No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
10	Leaf base pigmentation	5 plants	Observation	1:Absent 2:Very pale 3:Pale 4:Slightly pale 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark	Anthocyanin pigmentation present in the base of the lower surface of the 10th leaf from top 50-60 days after transplanting
11	Storage root shape	Block	Observation	0:Flat 1:Round 2:Round-Round elliptic 3:Round elliptic 4:Round elliptic-Elliptic 5:Elliptic 6:Elliptic-Long elliptic 7:Long elliptic 8:Very long elliptic 9:Extremely elliptic	Storage root outline shown in longitudinal section
12	Storage root skin color	Block	Observation	1:White 2:Yellow 3:Brown 4:Orange 5:Red 6:Reddish purple 7:Dark reddish purple 8:Purple 9:Other	The most representative skin color of stored root
13	Storage root flesh color	5 roots	Observation	1:White 2:Pale cream 3:Cream 4:Pale yellow 5:Yellow 6:Pale orange 7:Orange 9:Purple	Predominant color of cross and longitudinal sections made about the middle of freshly harvested storage roots
14	Anthocyanin pigmentation of storage root flesh	5 roots	Observation	1:Absent 2:Very pale 3:Pale 4:Slightly pale 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark	Anthocyanin pigmentation of cross and longitudinal sections of roots
15	Carotene pigmentation of storage root flesh	5 roots	Observation	1:Absent 2:Very pale 3:Pale 4:Slightly pale 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark	Carotene pigmentation of cross and longitudinal sections of roots

Plant	Sweet potato	431	Primary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Vine internode length	5 plants	Obs.&Measr.	1:Extremely short 2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long 9:Extremely long	Vine internode length 50-60 days after transplanting
2	Vine tip pubescence	5 plants	Observation	1:Absent 2:Very sparse 3:Sparse 4:Slightly sparse 5:Moderate 6:Slightly heavy 7:Heavy 8:Very heavy 9:Extremely heavy	Degree of hairiness of the vine apex 50-60 days after transplanting
3	Mature leaf color	5 plants	Observation	1:Yellow 2:Yellowish green 3:Pale green 4:Green 5:Deep green 6:Dark green 7:Pale brown 8:Brown 9:Purple	Color of the 10th fully expanded mature leaf from top 50-60 days after transplanting
4	Mature leaf size	5 plants	Observation	1:Extremely small 2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large 9:Extremely large	Size of the 10th leaf from top 50-60 days after transplanting
5	Petiole length	5 plants	Obs.&Measr.	1:Extremely short 2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long 9:Extremely long	Petiole length of the 10th leaf from top 50-60 days after transplanting
6	Petiole diameter	5 plants	Obs.&Measr.	1:Extremely thin 2:Very thin 3:Thin 4:Slightly thin 5:Intermediate 6:Slightly thick 7:Thick 8:Very thick 9:Extremely thick	Petiole diameter of the 10th leaf from top 50-60 days after transplanting
7	Storage root stalk length	10 plants	Obs.&Measr.	1:Extremely short 2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long 9:Extremely long	Length of stalk joining the storage roots to the stems
8	Variability of storage root shape	Block	Observation	1:Extremely uniform 2:Very uniform 3:Uniform 4:Slightly uniform 5:Intermediate 6:Slightly variable 7:Variable 8:Very variable 9:Extremely variable	Variability of storage root shape
9	Variability of storage root size	Block	Observation	1:Extremely uniform 2:Very uniform 3:Uniform 4:Slightly uniform 5:Intermediate 6:Slightly variable 7:Variable 8:Very variable 9:Extremely variable	Variability of storage root size
10	Longitudinal groove of storage root	Block	Observation	1:Absent 2:Very shallow 3:Shallow 4:Slightly shallow 5:Intermediate 6:Slightly deep 7:Deep 8:Very deep 9:Extremely deep	Depth of longitudinal grooves of storage root skin

Plant	Sweet potato	431	Primary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
11	Storage root cracking	Block	Observation	1:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much 9:Extremely much	Cracking on the storage root skin
12	Veins on storage root	Block	Observation	1:Absent 2:Very few 3:Few 4:Slightly few 5:Intermediate 6:Some 7:Much 8:Very much 9:Extremely much	Veins on the storage root skin
13	Smoothness of storage root skin	Block	Observation	1:Extremely smooth 2:Very smooth 3:Smooth 4:Slightly smooth 5:Intermediate 6:Slightly rough 7:Rough 8:Very rough 9:Extremely rough	Smoothness of storage root skin
14	Secondary skin color of storage root	Block	Observation	1:Absent 2:White 3:Yellow 4:Brown 5:Orange 6:Pink 7:Red 8:Purple	Secondary skin color of storage root
15	Size of storage root	Block	Observation	1:Extremely small 2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large 9:Extremely large	Storage root size

Plant	Sweet potato	431	Secondary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Grafting compatibility	3 plants	Observation	1:Incompatible 3:Slightly compatible 5:Moderately compatible 7:Compatible	Judge from rootstock wilting and scion growth after top grafting of sweet potato onto dwarf type of morning glory
2	Cross-incompatibility group	4 pollinations reciprocally	Others	1:Group A 2:Group B 3:Group C 4:Group D 5:Group E 9:Other	Identify cross incompatibility by reciprocal crosses with testers (A,B,C,D and E), according to pollen germination rate on the stigma.
3	Self-incompatibility	5 flowers	Others	1:Incompatible 3:Slightly compatible 5:Moderately compatible 7:Compatible 9:Highly compatible	Judge from pollen germination rate of self-pollination. Incompatible:0%, slightly compatible:20%, moderately compatible:20-50%, compatible:50-80%, highly compatible:>=80%
4	Time of sprouting	Block	Observation	1:Extremely early 2:Very early 3:Early 4:Slightly early 5:Intermediate 6:Slightly late 7:Late 8:Very late 9:Extremely late	Time of sprout emergence after root bedding into a nursery bed
5	Number of sprouts	Block	Observation	1:Almost none 2:Extremely few 3:Very few 4:Few 5:Intermediate 6:Some 7:Many 8:Very many 9:Extremely many	Observation of number of sprouts from bedded storage roots
6	Uniformity of sprouting	Block	Observation	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Moderate 6:Slightly high 7:High 8:Very high 9:Extremely high	Degree of uniformity of sprout emergence
7	Sprouting ability	Block	Others	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Judge from characters 4,5 and 6
8	Elongation of sprouts	Block	Observation	1:Extremely fast 2:Very fast 3:Fast 4:Slightly fast 5:Intermediate 6:Slightly slow 7:Slow 8:Very slow 9:Extremely slow	Elongation speed after sprout emergence
9	Storage root formation ability	Block	Observation	1:Excellent 2:Very good 3:Good 4:Slightly good 5:Intermediate 6:Slightly poor 7:Poor 8:Very poor 9:None	Compare the storage root number and size to control cultivar

Plant	Sweet potato	431	Secondary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
10	Storability of storage root in winter	20 roots	Measurement	1:Excellent 2:Very good 3:Good 4:Slightly good 5:Intermediate 6:Slightly poor 7:Poor 8:Very poor 9:Extremely poor	Root storability in a non climate-controlled room in winter. Count rotten roots 4-5 month later
11	Tolerance to storage root to low temperature	50 roots	Measurement	1:Excellent 2:Very good 3:Good 4:Slightly good 5:Intermediate 6:Slightly poor 7:Poor 8:Very poor 9:Extremely poor	Keep storage roots in an incubator of 7 centi degrees and above 70% RH for 90 days, and count rotten roots 60 and 90 days after incubation
12	Stem rot resistance	5 plants, 2 replications	Obs.&Measr.	3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant in the field just after inoculation of Fusarium oxysporum to sprouts, and investigate the damage of stem rot 40-50 days after planting.
13	Black rot resistance	10 plants, 2 replications	Obs.&Measr.	3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant in the field 3-4 days after inoculation of Ceratocystis fimbriata to sprouts. Investigate the damage of black rot 2-3 months after planting
14	Soil rot resistance	5 plants, 2 replications	Obs.&Measr.	3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant sprouts in the field where Streptomyces ipomoea has severely proliferated. Investigate the damage 50-60 days after planting.
15	Root knot nematode resistance	5 plants, 2 replications	Obs.&Measr.	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant sprouts in the field where Meloidogyne incognita has severely proliferated. Investigate the damage 60 days after planting.

Plant	Sweet potato	431	Secondary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Flower color (limb)	Block	Observation	1:White 2:Pink 3:Red 4:Purple 9:Others	Flower limb color
2	Flower length	10 flowers	Obs.&Measr.	3:Short 5:Intermediate 7:Long	Average length of flower (limb to bottom). Short:<=3.4 cm, intermediate:3.5-4.4 cm, long:>=4.5 cm
3	Flower width	10 flowers	Obs.&Measr.	3:Small 5:Intermediate 7:Large	Average width of flower limb. Small:<=3.4 cm, intermediate:3.5-4.4 cm, large:>=4.5 cm
4	Equality of sepal length	10 flowers	Observation	1:Outer two shorter 2:Equal	Compare outer two sepals to inner three sepals
5	Sepal shape	10 flowers	Observation	1:Ovate 2:Elliptic 3:Obovate 4:Oblong 5:Lanceolate	Shape of sepal apex
6	Sepal apex	10 flowers	Observation	1:Acute 2:Obtuse 3:Acuminate 4:Caudate	Sepal apex shape
7	Resprouting ability	Block	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Sprouting ability after the first picking of sprouts
8	Regrowth vigor	Block	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Vine growth activity after pruning in the field
9	Sprout weight	10 sprouts	Measurement	3:Light 4:Slightly light 5:Intermediate 6:Slightly heavy 7:Heavy	Average weight of 10 sprouts, light:<=10 g, intermediate:13-15 g, heavy:>=18 g
10	Root lesion nematode resistance	5 plants, 2 replications	Obs.&Measr.	3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant sprouts in the field where Pratylenchus coffeae has severely proliferated. Investigate the damage 90 days after planting
11	Sweet potato weevil resistance	5 plants, 2 replications	Obs.&Measr.	3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant sprouts in the field where Cylas formicarius has severely proliferated. Investigate the damage compared to control cultivars

Plant	Sweet potato	431	Secondary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
12	West Indian sweet potato weevil resistance	5 plants, 2 replications	Obs.&Measr.	3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low	Plant sprouts in the field where Cylas puncticollis has severely proliferated. Investigate the damage compared to control cultivars

Plant	Sweet potato	431	Tertiary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Storage root number per plant	Block	Measurement	1:Almost none 2:Extremely few 3:Very few 4:Few 5:Intermediate 6:Some 7:Many 8:Very many 9:Extremely many	Average number of storage root (>=50 g) produced from 10-40 plants
2	Storage root weight per 100 square meters	Block	Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly heavy 7:Heavy 8:Very heavy 9:Extremely heavy	Convert to the weight per 100 square meters
3	Percentage of storage root	Block	Calculation	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	Storage root weight/total root weight (including roots below 50 g) X 100 (%)
4	Yield	Block	Others	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	Judge from 1,2 and 3 items
5	Dry matter content of storage root	1 kg of storage roots	Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	Cut roots into small pieces, take two samples of 100 g dry at 70-80 centi degree preliminary and dry again at 105 centi degree for 6 hours. Dry matter/fresh weight (g)
6	Starch content of storage root	1 kg of storage roots	Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	Cut roots into small pieces, take two samples of 100 g, then crush by electrical mixer for 90 seconds, sieve them and remove the debris. Starch in 5 liters of water is settled overweight. Remove the top, and dry the starch under natural conditions and at 105 centi degree for 6 hours
7	Flesh color of steamed storage root		Observation	0:Gray 1:White 2:Pale yellow 3:Yellowish white 4:Yellow 5:Pale orange 6:Orange 7:Red 8:Reddish purple 9:Purple	Flesh color of storage root after steaming
8	Texture of steamed storage root flesh		Observation	1:Extremely moist 2:Very moist 3:Moist 4:Slightly moist 5:Intermediate 6:Slightly dry 7:Dry 8:Very dry 9:Extremely dry	Texture of storage root flesh after steaming

Plant	Sweet potato	431	Tertiary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
9	Fiber content of steamed storage root flesh		Observation	1:Extremely little 2:Very little 3:Little 4:Slightly little 5:Intermediate 6:Some 7:Many 8:Very many 9:Extremely many	Rating of objectionability due to fiber content of steamed storage root
10	Taste of steamed storage root flesh		Sensory	1:Extremely bad 2:Very bad 3:Bad 4:Slightly bad 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Taste of steamed root flesh
11	Sweetness of steamed storage root flesh		Measurement	% (round to the 1st decimal place)	Add 3 times volume of water to steamed root and mash. Measure the brix (%) of exudate from mash by refractometer
12	Blackening of steamed storage root flesh		Observation	1:None 2:Extremely little 3:Little 4:Slightly little 5:Intermediate 6:Slightly abundant 7:Abundant 8:Very abundant 9:Extremely abundant	Blackening of the cut surface of the steamed storage root flesh 24 hours after cutting

Plant	Sweet potato	431	Tertiary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Top weight per 100 square meters	Block	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Top weight of investigated block, convert to the weight per 100 square meters
2	Adaptability for early harvest	Block	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Investigate the storage root weight within 90 days after transplanting. Compare to the storage root weight of control cultivar and in standard cultivation
3	Adaptability for late planting	Block	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Investigate the storage root weight transplanting in late June. Compare to the storage root weight of control cultivar and in standard cultivation
4	Adaptability for heavy fertilization	Block	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Investigate the storage root weight under the high nitrogen manuring conditions. Compare to the storage root of check cultivar and standard cultivation.
5	Top dry matter content	6 kg of top , 2 replications	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Take 2 samples of 3 kg top, initially dry at 70-80 centi degrees, and dry again at 105 centi degrees for 6 hours. Dry weight/fresh weight (%)
6	Fragility of boiled storage root	5 slices	Observation	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Boil 1 cm thick root slices for 20 minutes. Compare their fragility to control cultivar
7	Starch whiteness		Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Use Color analyser
8	Starch particle size		Measurement	3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large	Use Centrifugal particle size analyzer
9	Starch viscosity		Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High	Use Viscograph

Plant	Sweet potato	431	Tertiary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
10	Storage root alpha-amylase activity		Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	
11	Storage root beta-amylase activity		Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	
12	Storage root polyphenol content		Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	
13	Storage root flavonoid content		Measurement	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	