

Plant		Potato		8(04002)	Primary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Color of sprouts	5 tubers	Observation	1:White 2:Whitish red 3:Pale red 4:Red 5:Reddish purple 6:Purple 7:Bluish purple 8:Blue 9:Other		Examine the color of sprouts under dark condition
2	Color of stem	Block	Observation	2:Green 3:Red 4:Dark red 5:Purplish red 6:Reddish purple 7:Purple 8:Dark purple 9:Other		The dominant color of the main stem at flowering stage
3	Number of flowers	5 clones	Measurement	(round to the 1st decimal place)		Number of flowers in the first flower cluster on the main stem
4	Angle of flower petals	5 clones	Observation	1:Acute 3:Slightly acute 5:Intermediate 7:Slightly obtuse 9:Obtuse		
5	Flower color	Block	Observation	2:White 3:Red 4:Reddish purple 5:Purple 6:Bluish purple 7:Blue 8:Orange 9:Yellow		Predominant color of flower petals
6	Number of tubers per clone	5 clones	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		Number of tubers per individual clone. Small:5 tubers, large:20 tubers
7	Shape of tuber	20 tubers	Observation	1:Globular 2:Flat round 3:Ovate 4:Obovate 5:Ellipsoidal 6:Long ellipsoidal 7:Cylindrical 9:Other		Shape index of tuber: L=length/width, T=thickness/width. Globular:(L=1.0, T>0.8), flat round:(L=1.0, T<0.8), long ellipsoidal:(L=>1.5), cylindrical:(L=>2.0)
8	Number of eyes	10 tubers	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		Count the number of eyes per tuber. Extremely small:5 or fewer, extremely large:20 or more
9	Depth of eyes	10 tubers	Observation	1:Extremely shallow 2:Very shallow 3:Shallow 4:Slightly shallow 5:Intermediate 6:Slightly deep 7:Deep 8:Very deep 9:Extremely deep		
10	Color of tuber skin	Block	Observation	2:White 3:Whitish yellow 4:Yellow 5:Yellowish brown 6:Brown 7:Pale red 8:Red 9:Purple		Examine the predominant color of tuber skin

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11	Color of tuber flesh	10 tubers	Observation	2:White 3:Whitish yellow 4:Yellow 5:Yellowish 6:Brown 7:Pale red 8:Red 9:Purple		Cut tuber longitudinally, and examine the predominant color of tuber flesh

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1	Stem length	5 clones	Measurement	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 main stem from ground level to the growing point is measured at flower falling stage
2	Number of branches	Block	Observation	1:None 2:Extremely small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large 9:Extremely large	Count the number of branches
3	Number of fruits	Block	Observation	1:None 2:Almost none 3:Very few 4:Few 5:Intermediate 6:Some 7:Many 8:Very many 9:Extremely numerous	Examine number of fruits
4	Length of stolons	Block	Observation	1:Extremely short 2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long 9:Extremely long	Observe the longest stolon at harvest time
5	Secondary color of tuber skin	Block	Observation	1:None 2:White 3:Whitish yellow 4:Yellow 5:Yellowish brown 6:Brown 7:Pale red 8:Red 9:Purple	Examine the secondary predominant color of the tuber skin
6	Appearance of secondary color of tuber skin	Block	Observation	1:None 2:Eye-shaped 3:Eyebrow-shaped 5:Spotted 6:Mottled	Examine the appearance of the secondary color of the tuber skin
7	Roughness of tuber skin	Block	Observation	3:Smooth 4:Slightly smooth 5:Intermediate 6:Slightly rough 7:Rough	Examine the roughness of tuber skin
8	Secondary color of tuber flesh	5 clones	Observation	1:None 2:White 3:Whitish yellow 4:Pale yellow 5:Yellow 6:Orange 7:Red 8:Purple	Cut tuber longitudinally, and examine its secondary color
9	Appearance of secondary color of tuber flesh	Plot	Observation	1:None 2:Spotted 3:Linear 4:Mottled 5:Central 6:Ring	Examine the appearance of the secondary color of tuber flesh
10	Size of tuber	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	Record the number and weight of tubers heavier than 20 g
11	Uniformity of tuber size	Block	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Extremely good	Uniformity of tuber number and weight heavier than 20 g

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12	Internal brown spots	5 clones	Observation	1:None 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Examine the degree of development of internal brown spots
13	Hollow heart	5 clones	Observation	1:None 2:Almost none 3:Very few 4:Few 5:Intermediate 6:Slightly abundant 7:Abundant		Examine the development of hollow hearts of rather large tubers

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1	Storability	10 tubers	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent		Check the decrease of weight of tubers during ordinary storage, and the degree of putrefaction, but not the length of dormancy
2	Resistance to bacterial wilt	10 clones, 2 replications	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Plant accessions in a field injected with the bacterial wilt pathogen, and evaluate the resistance based on the percentage of infected plants, amount of dead stem and leaves. The test is carried out under warm and humid conditions.
3	Genotype in relation to reaction to late blight	2 replications	Measurement			Inoculate late blight on detached healthy leaves and determine the genotype resistant to late blight. For example, genotype r plant is susceptible to race o and genotype R1 plant is resistant to race O and susceptible to race 1.
4	Resistance to bacterial soft rot	10 clones, 2 replications	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Inoculate bacterial soft rot on the cut surface of tubers, then examine the degree of putrefaction of the tubers
5	Resistance to tuber putrefaction	10 clones, 2 replications	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Plant accessions in an infested and accelerate the development of late blight by spinkling at night. Examine the degree of tuber putrefaction at harvest time and at the beginning of storage.
6	Resistance to powdery scab	10 clones, 2 replications	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Plant accessions in a field injected with the powdery scab pathogen, and evaluate the resistance based on percentage of infected tubers.

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7	Genotypic test for cyst-nematode resistance	2 replications	Measurement	1:h 2:H1 3:H2 4:H3 5:H4		Inoculation test in greenhouse

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1	Resistance to leaf roll virus	10 clones, 2 replications	Obs.&Measr.	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 9:Immune		Plant test potato accessions in a field and make aphids visit the potato field without protection. Evaluate the resistance by examining the symptoms
2	Resistance to Y mosaic virus	10 clones, 2 replications	Obs.&Measr.	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 9:Immune		Sap infection test for Y mosaic virus with carborundum methods
3	Resistance to black scurf	10 clones, 2 replications	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Evaluate the resistance based on the symptoms together with control cultivars
4	Resistance to common scab	10 clones, 2 replications	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Plant in a field infected with common scab together with control plants, observe the symptoms on tubers
5	Resistance to root lesion nematodes	5 clones, 2 replications	Obs.&Measr.	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Plant in a field with high population of root lesion nematodes together with control cultivars, observe the symptoms on roots

Plant		Potato		8(04002)	Tertiary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Tuber yield	Block	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		Weigh tubers heavier than 20 g, and the obtained values (unit:0.1 kg) are expressed by weight per are (kg/a).
2	Number of tubers	Block	Measurement	1:Extremely small 2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large 9:Extremely large		Count the numbers of tubers heavier than 20 g, and express by number per are (tubers/a)
3	Yield of marketable tubers	Block	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		Weigh tubers heavier than 60 g as in the case of tuber yield, and expressed by kg/a.
4	Number of marketable tubers	Block	Measurement	1:Extremely small 2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large 9:Extremely large		Count the number of marketable tubers as in the case of number of tubers and express by tuber/a.
5	Flesh type	4 pieces	Observation	1:Extremely sticky 2:Very sticky 3:Sticky 4:Slightly sticky 5:Intermediate 6:Slightly mealy 7:Mealy 8:Very mealy 9:Extremely mealy		Examine the flesh quality of boiled tubers and determine whether mealy or non-mealy
6	Degree of blackishness	4 pieces	Observation	1:None 2:Negligible 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Assess the degree of blackishness of flesh, one hour after boiling
7	Degree of fragility	4 pieces	Observation	1:None 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Peel and cut tubers into half longitudinally. Boil tubers for 20 minutes, observe tubers and determine the degree of fragility
8	Feeling to the palate	4 pieces	Sensory	3:Smooth 4:Slightly smooth 5:Intermediate 6:Slightly coarse 7:Coarse		Assess by a panel test consisting of at least 3 persons
9	Taste		Sensory	1:Extremely bad 2:Very bad 3:Bad 4:Slightly bad 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Extremely good		Assess by a panel test consisting of at least 3 persons

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10	Starch value	2 kg	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		Test by Rayman balance. Starch value of 12% is classified as low, 16% is classified as intermediate, 20% is classified as high.
11	Whiteness of starch	2 replications	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Measure whiteness of starch with the whiteness meter. Whiteness value lower than 90 is classified as low and higher than 95 is classified as high.
12	Particle size of starch	2 replications	Measurement	3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large		Particle size is measured with a specific instrument.
13	Viscosity of starch	2 replications	Measurement	3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Measure the viscosity of starch with the Brabender's Viscograph, and measure the temperature at which gelatinization starts and maximum viscosity

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1	Degree of browning of potato chips	10 pieces	Measurement	1:None 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Fry sliced tubers in common way. Measure the degree of browning of chips by using a colormeter (Agtron) with rough crushed samples
2	Degree of browning of fried potatoes	10 pieces	Measurement	1:None 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High		Cut potatoes longitudinally into pillars 1 cm. Fry potatoes twice at low (140 centi degree) temperature and at high (180 centi degree) temperature. Evaluate the degree of browning of fried potatoes compared with the standard color chart.
3	Crispiness of chips and fried potatoes	10 pieces	Observation	3:Crispy 4:Slightly crispy 5:Intermediate 6:Slightly soggy 7:Soggy		Examine the fat absorbed and retained on surface, and assess the stiffness of the product