

Plant		Wheat		2(02001)	Primary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Plant habit	Block	Observation	2:Erect 3:Nearly-erect 4:Semi-erect 5:Intermediate 6:Semi-prostrate 7:Nearly-prostrate 8:Prostrate		Plant type before the initiation of internode elongation (January to February). In the district of long snow cover, growth habit is observed before snow cover.
2	Culm length	10 plants	Measurement	cm (integer)		Length from ground level to the ear neck of the longest culm
3	Ear length	10 plants	Measurement	cm (round to the 1st decimal place)		Length from ear neck to the top of ear of the longest culm
4	Existence of awn	Block	Observation	0:Awnless 2:Very scarce 3:Scarce 4:Slightly scarce 5:Intermediate 6:Slightly abundant 7:Abundant 8:Very abundant		Scarce=10%, intermediate=25%, abundant=40%
5	Glume color	Block	Observation	1:Light yellow 2:Yellow 3:Yellowish brown 4:Brown 5:Reddish brown 6:Red 7:Reddish purple 8:Purple 9:Dark purple		Glume color at maturity
6	Grain size	Block	Observation	2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large		Grade of grain size
7	Grain color	Block	Observation	0:White 1:Light yellow 2:Yellow 3:Yellowish brown 4:Brown 5:Reddish brown 6:Red 7:Reddish purple 8:Purple 9:Dark purple		Color of grain
8	Heading time	Block	Observation	date		Date when 40-50% ears of available stems have emerged
9	Maturity date	Block	Observation	date		Date when color at ear neck in more than 80% of total ears turns yellow and grains become as hard as wax.

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1	Culm angle	Block	Observation	2:Very close 3:Close 4:Slightly close 5:Intermediate 6:Slightly open 7:Open 8:Very open		Culm angle at the full heading time to maturity. Open type shows a large angle
2	Leaf sheath color	Block	Observation	0:Absent 9:Present		Presense of anthocyanin in leaf sheath at the emergence of seedlings
3	Culm thickness	Block	Observation	2:Very thin 3:Thin 4:Slightly thin 5:Intermediate 6:Slightly thick 7:Thick 8:Very thick		Thickness of culm at maturity
4	Culm stiffness	Block	Observation	2:Very stiff 3:Stiff 4:Slightly stiff 5:Intermediate 6:Slightly soft 7:Soft 8:Very soft		Stiffness of culm at maturity
5	Culm waxiness	Block	Observation	0:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much		Degree of culm waxiness on the upper first internode at heading time
6	Leaf color	Block	Observation	2:Very light 3:Light green 4:Slightly light 5:Green 6:Slightly dark 7:Dark green 8:Very dark		Leaf color at tillering stage and booting stage or at observation time of growth habit
7	Leaf sheath waxiness	Block	Observation	0:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much		Degree of waxiness on the upper first leaf sheath at heading time
8	Leaf sheath pubescence	Block	Observation	0:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much		Degree of leaf sheath pubescence
9	Leaf blade angle	Block	Observation	0:Absent 2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large		Degree of nutant in leaf at the full heading time
10	Leaf flecking	Block	Observation	0:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much		Degree of light yellow spots on leaves at the full heading time
11	Spike shape	Block	Observation	1:Drill form 2:Drill form-Fusiform 3:Fusiform 4:Fusiform-Oblong 5:Oblong 6:Oblong-Clavate 7:Clavate 8:Clavate-Elliptical 9:Elliptical		Classification of spike shape

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12	Spikelet density	10 spikes	Obs.&Measr.	2:Very sparse 3:Sparse 4:Slightly sparse 5:Intermediate 6:Slightly dense 7:Dense 8:Very dense	Number of internodes in rachis (=number of total spikelets - 1)/rachis length(cm)	
13	Ear protrusion	5 spikes	Measurement	2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long	Distance from the tip of flag leaf sheath to spike neck at maturity	
14	Spike waxiness	Block	Observation	0:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much	Degree of spike waxiness at the full heading time	
15	Awn length	10 spikes	Obs.&Measr.	2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long	Measurement of the longest 10 awns, and/or comparison with standard cultivars	
16	Glume pubescence	Block	Observation	0:Absent 9:Present	Glume pubescence at the full heading time	
17	Anther color	Block	Observation	2:Yellow 8:Purple 9:Others	Observation of anther color at anthesis	
18	Grain shape	Block	Obs.&Measr.	2:Very round 3:Round 4:Slightly oval 5:Oval 6:Slightly slender 7:Slender 8:Very slender	Evaluation based on the ratio of length to width of grain	
19	Size of brush area of grain	Block	Observation	2:Very small 3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large 8:Very large		

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1	Grade of spring habit	10 plants	Obs.&Measr.	1:1 2:2 3:3 4:4 5:5 6:6 7:7		Observe heading performance after seeds are sown at a constant interval (usually 10 days) from February to April. Accessions with high spring habit are classified as 1, and with high winter habit is clasified as 7.
2	Spring wheat or winter wheat	Block	Observation	2:Spring type 8:Winter type		Classify by grade of spring habit
3	Sprouting resistance	5 ears	Measurement	2:Very difficult 3:Difficult 4:Slightly difficult 5:Intermediate 6:Slightly easy 7:Easy 8:Very easy		Sprouting of maturing ears under wet conditions
4	Threshability	Block	Observation	2:Very difficult 3:Difficult 4:Slightly difficult 5:Intermediate 6:Slightly easy 7:Easy 8:Very easy		Investigation of easiness or difficulty for threshing at maturity
5	Lodging resistance	Block	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Synthetic judgment based on the stage of lodging occurrence and degree of lodging
6	Yellow mosaic resistance	10 plants, 2 replications	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judge by disease symptom around internode elongation stage and uniformity of heading (middle and southern parts of Japan)
7	Scab resistance	30 plants, 4 replications	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judge by the degree of disease infection at dough ripe stage to maturity
8	Powdery mildew resistance	50 plants, 2 replications	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judge by the degree and extension of disease symptom at ripening stage
9	Leaf rust resistance	10 plants, 2 replications	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judge by the degree and extension of symptom at ripening stage or infection type in seedling

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10	Stem rust resistance	Block	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judge by the degree and extension of disease symptom at ripening stage (northern part of Japan)

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1	Time of internode elongation	Block	Observation	2:Very early 3:Early 4:Slightly early 5:Intermediate 6:Slightly late 7:Late 8:Very late		Observation of internode elongation from the end of January to the beginning of April (central and southern parts of Japan)
2	Presense, absense or degree of black point grain	Block	Obs.&Measr.	0:Absent 2:Almost none 3:Very little 4:Little 5:Intermediate 6:Some 7:Much 8:Very much		Presense of black points on embryo and endosperm
3	Cold tolerance	100 plants, 2 replications	Obs.&Measr.	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judgment by the rate of winter-killing and the degree of damage after overwintering (northern part of Japan)
4	Tolerance to moisture	Block	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Tolerance to excessive moisture (note observation stage)
5	Snow mold tolerance	Block	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Judgment by the degree of plant damage after snow melting (snow falling area)
6	Tolerance to soil upheaval	40 plants, 4 replications	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Tolerance to upheaval against frozen soil. Synthetic judgment by the rate of surviving plants at two investigation times
7	Resistance to insect pests	Block	Observation	2:Very high 3:High 4:Slightly high 5:Intermediate 6:Slightly low 7:Low 8:Very low		Note insect name
8	Cytoplasmic male sterility gene	Block	Others	0:Absent 9:Present		
9	Restorer gene	Block	Others	0:Absent 9:Present		

Plant		Wheat		2(02001)	Tertiary essential character	
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1	Potential yield	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Comparison of weight of whole-grains per area with a standard cultivar
2	1000 grain weight	3 replications	Measurement	2:Very light 3:Light 4:Slightly light 5:Intermediate 6:Slightly heavy 7:Heavy 8:Very heavy		Conversion to 1000 grain weight after counting of grains with 20 gram samples (grain moisture 12.5%)
3	Test weight	3 replications	Measurement	2:Very light 3:Light 4:Slightly light 5:Intermediate 6:Slightly heavy 7:Heavy 8:Very heavy		Weight of volume in 1 liter (grain moisture content 12.5%). Measurement more than 2 times using liter weight vessel.
4	Grain quality	Block	Observation	1:Excellent 2:Very good 3:Good 4:Slightly good 5:Intermediate 6:Slightly poor 7:Poor 8:Very poor 9:Extremely poor		Comprehensive synthetic judgment of appearance of grain based on fullness, uniform of size and shape, bright color of grains
5	Grain hardness	Block	Obs.&Measr.	2:Very soft 3:Soft 4:Slightly soft 5:Intermediate 6:Slightly hard 7:Hard 8:Very hard		Quantity of hard starch granule. Judge by BM ratio or microscopic observation
6	Glossiness of grain	Block	Observation	3:Powdery 4:Slightly powdery 5:Intermediate 6:Slightly glossy 7:Glossy		Measurement of percentage of glossy kernels. Powdery:<=30% glossy, intermediate:=30-70% glossy, glassy:>=70% glossy
7	Crude protein content of 60% flour	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Total nitrogen % in 60% flour x 5.70

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1	Flour yield	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		(Flour weight/weight of flour and bran) x 100
2	Milling score	Block	Calculation	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		100- ((80 - flour yield) + 50 x (total ash - 0.30))
3	Whiteness of flour	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Classify by reflection rate of 60% flour in 455 micro meter wave(R455) using a microspectroscopy
4	Brightness of flour	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Classify by reflection rate of 60% flour in 554 micro meter wave(R554) using a microspectroscopy
5	Yellowness of flour	Block	Calculation	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Calculate by log R455 - log R554, description in D455 - D554 of 60% flour
6	Water absorption rate	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Classify by rate of water quantity necessary to raise dough strength to 500 B.U. by Farinograph
7	Valorimeter value	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Dough property evaluated by figure of farinogram
8	Dough fermentation quality	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Dough strength evaluated by the figure of extensogram after dough fermentation of 135 minutes storage
9	Resistance to extension in extensogram	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Dough extension evaluated by the height in the figure of extensogram after dough fermentation at 135 minutes storage
10	Extensibility in extensogram	Block	Measurement	2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long		Dough extensibility evaluated by the base length in the figure of extensogram after dough fermentation at 135 minutes storage



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11	Coefficient in extensogram	Block	Calculation	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Resistance to extension in extensogram(R) / extensibility in extensogram(E)
12	Maximum viscosity	Block	Measurement	2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high		Degree of amylose activity in wheat flour measured by Amylograph