

Plant		Sugar beet		441	Primary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Polyploidy	30 plants	Observation	1:Haploid 2:Diploid 4:Anisoploid 6:Triploid 8:Tetraploid 9:Polyploid		Number of chromosomes in young leaves
2	Number of germs	Block	Observation	3:Monogerm 7:Multigerm		Judged by seed shape
3	Red coloration of hypocotyl of seedling	Block	Observation	1:Absent or extremely little 2:Very little 3:Little 4:Slightly little 5:Intermediate 6:Some 7:Much 8:Very much 9:Extremely abundant		Rate of red colored plants at seedling stage
4	Plant type	Block	Observation	1:Erect 2:Nearly erect 3:Semi-erect 4:Slightly semi-erect 5:Intermediate 6:Slightly semi-prostrate 7:Semi-prostrate 8:Nearly prostrate 9:Prostrate		At the full growing stage
5	Leaf shape	Block	Observation	1:Very thin 2:Thin 3:Lanceolate 4:Slightly lanceolate 5:Intermediate 6:Slightly heart shape 7:Heart shape 8:Wide 9:Very wide		At the full growing stage
6	Root length	10 plants	Measurement	cm (round to the 1st decimal place)		Length of true tap roots over 2 cm diameter at harvest stage
7	Root shape	Block	Observation	1:Short conic 2:Slightly short conic 3:Conic 5:Long conic-column 7:Long conic 8:Long 9:Very long		At harvest stage
8	Branched roots	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		At harvest stage

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No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Leaf length	10 plants	Measurement	cm (round to the 1st decimal place)		Length from the petiole base to the leaf top at the full growing stage
2	Leaf number	10 plants	Measurement	(round to the 1st decimal place)		Number of leaves of over 5 cm in length at the full growing stage
3	Leaf color	Block	Observation	1:Extremely light 2:Very light 3:Light 4:Slightly light 5:Intermediate 6:Slightly dark 7:Dark 8:Very dark 9:Extremely dark		Degree of greenness of leaves at the full growing stage
4	Leaf shrinkage	Block	Observation	1:Extremely little 2:Very little 3:Little 4:Slightly little 5:Intermediate 6:Some 7:Much 8:Very much 9:Extremely much		Degree of leaf shrinkage at the full growing stage
5	Laminae size	10 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 leaf at the full growing stage
6	Leaf petiole length	10 plants	Measurement	cm (round to the 1st decimal place)		Length of petiole at the full growing stage (the largest leaf)
7	Leaf petiole width	10 plants	Measurement	mm (round to the 1st decimal place)		Width of petiole at the full growing stage (central part of petiole of the longest leaf)
8	Root circuit	10 plants	Measurement	cm (round to the 1st decimal place)		Circuit of the widest part of a root at harvest stage
9	Crown size	10 plants	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		Judged based on the ratio of root weight to crown weight at harvest stage
10	Exposed crowns	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		Degree of exposure of crown
11	Root wrinkles	Block	Observation	1:Very few 3:Few 5:Intermediate 7:Many 9:Very many		Degree of wrinkling on roots at harvest stage

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12	Flesh quality	Block	Observation	1:Very soft 3:Soft 5:Intermediate 7:Hard 9:Very hard	Judged by the difficulty of cutting roots at harvest stage

Plant		Sugar beet		441	Secondary essential character
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1	Bolting tolerance	1 block, 30 plants	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	Judged by the degree of bolting in field at harvest stage or induce bolting artificially by low temperature long day treatment (5 centi degree, 15 hours illumination for 35-45 days)
2	Resistance to Cercospora	Block	Observation	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high	Judged by fungi inoculation or symptom occurrence in an untreated field

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No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Tolerance to excessive moisture	Block	Observation	% (round to the 1st decimal place)		Ratio of rotten plants at harvest stage in field of excess water by irrigation in mid to late July
2	Resistance to Rhizoctonia root rot	Block	Observation	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high		Judged by fungi inoculation or symptom occurrence in an untreated field
3	Resistance to foliage blight	Block	Observation	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high		Judged by fungi inoculation or symptom occurrence in an untreated field
4	Resistance to beet necrotic yellow vein virus	Block	Obs.&Measr.	1:Extremely low 2:Very low 3:Low 4:Slightly low 5:Intermediate 6:Slightly high 7:High 8:Very high 9:Extremely high		Judged by fungi inoculation or symptom occurrence in an untreated field
5	Resistance to Aphanomyces root rot	Block	Observation	1:Extremely low 3:Low 5:Intermediate 7:High 9:Extremely high		Judged by symptom occurrence in an untreated infested field

Plant		Sugar beet		441	Tertiary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Root weight	3 replications	Measurement	kg/a (integer)		At harvest stage
2	Sugar content in root	3 replications	Measurement	% (round to the 2nd decimal place)		At harvest stage
3	Amino-nitrogen content	3 replications	Measurement	meq/100 g (round to the 2nd decimal place)		At harvest stage
4	Sodium content	3 replications	Measurement	meq/100 g (round to the 2nd decimal place)		At harvest stage
5	Potassium content	3 replications	Measurement	meq/100 g (round to the 2nd decimal place)		At harvest stage
6	Sugar yield	3 replications	Calculation	kg/a (integer)		At harvest stage

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1	Impurity index		Calculation	% (round to the 2nd decimal place)	At harvest stage, (3.5 Na + 2.5 K + 10 alpha - amino nitrogen)/sugar content x 100
2	Top weight	3 replications	Measurement	kg/a (integer)	At harvest stage
3	Top/root ratio	3 replications	Calculation	* (round to the 2nd decimal place)	At harvest stage