| Plant ${ }^{\text {S }}$ | Sugar beet |  |  | 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 |


| Plant |  | Sugar beet |  | Primary optional character |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 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 |


| Plant ${ }^{\text {Sugar beet }}$ |  |  |  |  | 441 | Primary optional character |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No |  | aracters | No. of samples | Methods | Rank or measurement unit |  |  |  | Remarks |
| 12 | Flesh quality |  | Block | Observation | 1:Very sof <br> 9:Very hard | 3:Soft | 5:Intermediate | 7:Hard | Judged by the difficulty of cutting roots at harvest stage |


| Plant ${ }^{\text {S }}$ |  | Sugar beet |  | Secondary essential character |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No | Characters | No. of samples | Methods | Rank or measurement unit | Remarks |
| 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 |


| Plant | Sugar beet |  | 441 | Secondary optional character |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 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 <br> 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 <br> 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 <br> 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 |  | 44 | Tertiary essential character |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No |  | racters | 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 |


| Plant |  | Sugar beet |  |  | Tertiary optional character |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No | Characters |  | No. of samples | Methods | Rank or measurement unit | Remarks |
| 1 | Impurity index |  |  | Calculation | \% (round to the 2nd decimal place) | At harvest stage, (3.5 Na + $2.5 \mathrm{~K}+10$ 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 |

