Plant	Sorghum	463	Primary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Culm length	10 plants	Measurement	cm (integer)	Length from the ground to the neck node of panicle of main stem
2	Number of tillers	10 plants	Measurement	Number/plant (round to the 1st decimal place)	Number of tillers longer than 1/3 height of main stem per plant for green forage type, or number of panicles per plant for grain type
3	Panicle length	10 plants	Measurement	cm (round to the 1st decimal place)	Length from the neck node to the tip of panicle
4	Panicle shape	10 plants	Observation	1:Broom 2:Lax cone 3:Cone 5:Spindle 7:Cylinder 9:Short cylinder	Panicle shape at maturity
5	Grain color	10 plants	Observation	1:White 2:Yellowish white 3:Yellow 4:Orange 5:Red 6:Reddish brown 7:Brown 8:Purplish brown 9:Other	Color of threshed and dehulled grains at maturity
6	Date of heading	10 plants	Observation	date	Date when 50% of plants have begun heading
7	Diameter of culm	10 plants	Measurement	mm (round to the 1st decimal place)	Long diameter of the middle of internode of main stem at 10 to 15 cm above the ground
8	Leaf length	10 plants	Measurement	cm (integer)	Length of the longest leaf blade
9	Leaf width	10 plants	Measurement	mm (round to the 1st decimal place)	Width of the widest part of the longest leaf blade
10	Weight of 1000 grains	10 plants	Measurement	g (round to the 1st decimal place)	Weight of 1000 grains estimated by sampling 100 mature grains with duplications after threshing and removing glumes

Plant	Sorghum	463	Primary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Grain weight per panicle	10 plants	Measurement	g (round to the 1st decimal place)	Weight of cleaned grains per panicle on main stem
2	Panicle type	10 plants	Observation	1:Open 5:Intermediate 9:Compact	Inflorescence type at maturity
3	Grain density on panicle	10 plants	Observation	1:Very sparse 3:Sparse 5:Intermediate 7:Dense 9:Very dense	Density of grains on panicle at maturity
4	Date of maturity	10 plants	Observation	date	Date when grains at 1/3 of panicle length from the base of panicle became as hard as wax in most panicles
5	Coleoptile color	10 plants	Observation	1:Green 5:Mixed 9:Purple	Coleoptile color after germination. Green:more than 70% of seedlings have green coleoptiles, mixed:other, purple:more than 70% have purple coleoptiles
6	Quantity of lipid white powder on stems and sheaths	10 plants	Observation	0:None 3:Little 4:Slightly little 5:Intermediate 6:Some 7:Much 8:Very much 9:Extremely much	Quantity of waxy white powder on stems and sheaths 50 days after sowing
7	Number of leaves on main stem	10 plants	Measurement	(round to the 1st decimal place)	Number of leaves on main stem
8	Angle between leaf and stem	10 plants	Observation	3:Small 4:Slightly small 5:Intermediate 6:Slightly large 7:Large	Angle that the longest leaf makes with the stem at heading time. Small:30 degrees, intermediate:45 degrees, large:60 degrees
9	Color of midrib	10 plants	Observation	1:White 2:Light green 3:Green 4:Green-Orange 5:Orange 6:Orange-Brown 7:Brown 9:Mixed	Midrib color of a few leaves below the longest leaf at heading time
10	Number of panicles	10 plants	Measurement	Number/plant (round to the 1st decimal place)	Number of mature panicles per plant
11	Neck length of panicle	10 plants	Observation	1:Not emerged 2:Very short 3:Short 4:Slightly short 5:Intermediate 6:Slightly long 7:Long 8:Very long 9:Extremely long	Neck length emerged from flag leaf sheath to the base of panicle

Plant	Sorghum	463	Primary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
12	Awn presence	10 plants	Observation	0:Absent 9:Present	Presence of awns at maturity
13	Glume color	10 plants	Observation	1:Gray 2:Yellow 3:Yellowish brown 4:Orange 5:Red 6:Reddish brown 7:Brown 8:Purplish brown 9:Black	Color of glumes of mature grain
14	Polyembryony	10 plants	Observation	0:Absent 9:Present	Presence of twin or triple embryos at maturity
15	Grain shape	10 plants	Observation	1:Boat 2:Boat-Egg 3:Egg 4:Egg-Oval 5:Oval 6:Oval-Round 7:Round 8:Round-Fan 9:Fan	Shape of grains observed by sampling 10 mature grains per plant after threshing and removing glumes
16	Rhizome presence	10 plants	Observation	0:Absent 9:Present	Presence of rhizomes observed at maturity
17	Growth in early stage	10 plants	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Plant vigor observed 30 to 40 days after seeding
18	Flowering time	10 plants	Observation	date	Date when 50% of plants have flowered
19	Degree of self fertility	10 plants	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	Ratio of self fertility determined by bagging the panicle on main stem
20	Stem juiciness	10 plants	Observation	1:Dry 5:Mixed 9:Juicy	Stem juiciness observed on the cross section of stem at heading time. Dry:70% of plants are juicy, mixed:mixed, juicy:70% of plants are dry
21	Hullability	10 plants	Observation	1:Extremely easy 2:Very easy 3:Easy 4:Slightly easy 5:Intermediate 6:Slightly hard 7:Hard 8:Very hard 9:Extremely hard	Degree of hullability estimated by rubbing heads with hands in the field at maturity
22	Ease of removing glumes	10 plants	Observation	1:Extremely easy 2:Very easy 3:Easy 4:Slightly easy 5:Intermediate 6:Slightly hard 7:Hard 8:Very hard 9:Extremely hard	Ease of removing glumes from grains estimated by rubbing heads with hands
23	Grain texture	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	Horny portion (semi-transparent) in endosperm of grain. Small:1/3 part of endosperm is horny, intermediate:1/2 part, large:2/3 part

Plant	Sorghum	463	Primary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
24	Endosperm type	10 plants	Observation	1:Non-glutinous 5:Intermediate 9:Glutinous	Glutinous or nonglutinous endosperm type tested by the potassium iodide reaction of clean grains cut in half

Plant	Sorghum	463	Secondary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Number of regenerated tillers	10 plants	Observation	1:Almost none 2:Extremely few 3:Very few 4:Few 5:Intermediate 6:Some 7:Many 8:Very many 9:Most	Number of regenerated tillers 10 to 20 days after harvest
2	Regrowth	10 plants	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Plant vigor 10 to 20 days after harvest
3	Lodging resistance	10 plants	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	Resistance to lodging based on the rate of lodging plants under the dense and late planting conditions or the hardiness of stem measured by a gauge
4	Perenniality	10 plants	Observation	1:Annual 9:Perennial	Perenniality observed the spring after overwintering

Plant	Sorghum	463	Secondary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Leaf blight resistance	10 plants	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	Resistance to Setosphaeria turcica based on the degree of infection by artificial inoculation or planting in an infected field
2	Leaf-sheath blight resistance	10 plants	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	Resistance to Rhizoctonia solani based on the degree of infection (infection index=infected leaf height/culm height x 100) by artificial inoculation or planting in an infected field
3	Bacterial stripe resistance	10 plants	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	Resistance to Burkholderia andropogonis observed when the infection is apparent
4	Zonate leaf spot resistance	10 plants	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	Resistance to Gloeocercospora sorghi observed when the infection is apparent
5	Target spot resistance	10 plants	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	Resistance to Bipolaris cookei observed when the infection is apparent
6	Rust resistance	10 plants	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	Resistance to Puccinia purpurea observed when the infection is apparent
7	Anthracnose resistance	10 plants	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	Resistance to Colletotrichum sublineolum observed when the infection is apparent
8	Ergot resistance	10 plants	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	Resistance to Claviceps sorghicola or C. africana observed when the infection is apparent
9	Aphid resistance	10 plants	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	Resistance to aphids observed when the damage is apparent
10	Oriental corn borer resistance	10 plants	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	Resistance to Ostrinia furnacalis observed when the damage is apparent

Plant	Sorghum	463	Secondary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
11	Armyworm, pink borer, etc.resistance	10 plants	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	Resistance to Mythimua separata, Sesamia inferens, etc. observed when the damage is apparent
12	Bird resistance	10 plants	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	Resistance to birds observed when the damage is apparent
13	Growth under low temperature	10 plants	Obs.&Measr.	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Extremely good	Growth under low temperature conditions in the field or in the incubator for chilling treatment
14	Drought resistance	10 plants	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	Resistance to drought conditions in the field or in the installation for drought treatment
15	Tolerance to excess moisture	10 plants	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	Tolerance to wet conditions in the field or in the installation for wet treatment
16	Viviparity	10 plants	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	Viviparity observed when it is apparent

Plant	Sorghum	463	Tertiary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Fresh foliage yield of first harvest	2 plots	Measurement	kg/a (integer)	Fresh foliage yield estimated by weighing leaves and stems of at least 10 plants at first harvest, that is at dough ripe stage for whole-crop silage
2	Fresh head yield of first harvest	2 plots	Measurement	kg/a (integer)	Fresh yield of heads estimated by weighing heads of at least 10 plants at dough ripe stage of the first harvest
3	Total fresh yield of first harvest	2 plots	Calculation	kg/a (integer)	Total fresh yield of the first harvest calculated by fresh foliage + fresh head yield
4	Dry matter ratio of foliage at the first harvest	2 plots	Measurement	% (round to the 1st decimal place)	Dry matter ratio of foliage measured by sampling at least 1 kg of fresh foliage cut into pieces from more than 5 plants at the first harvest and drying at 70 centi degrees for 48 hours
5	Dry matter ratio of head of first harvest	2 plots	Measurement	% (round to the 1st decimal place)	Dry matter ratio of foliage measured by sampling at least 0.3 kg of fresh foliage cut into pieces from more than 5 plants at the first harvest and drying at 70 centi degrees for 48 hours
6	Dry matter yield of foliage of first harvest	2 plots	Calculation	kg/a (round to the 1st decimal place)	Dry matter yield of forage of first harvest calculated by fresh foliage yield x dry matter ratio of foliage/100
7	Dry matter yield of head of first harvest	2 plots	Calculation	kg/a (round to the 1st decimal place)	Dry matter yield of head of the first harvest calculated by fresh head yield x dry matter ratio of head/100

Plant	Sorghum	463	Tertiary essential character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
8	Total dry matter yield of first harvest	2 plots	Calculation	kg/a (round to the 1st decimal place)	Total dry matter yield of the first harvest calculated by dry matter yield of foliage + dry matter yield of head
9	Fresh foliage yield of aftermath	2 plots	Measurement	kg/a (integer)	Fresh yield of leaves and stems of aftermath measured as for the first harvest
10	Fresh head yield of aftermath	2 plots	Measurement	kg/a (integer)	Fresh yield of heads of aftermath measured as for the first harvest
11	Total fresh yield of aftermath	2 plots	Measurement	kg/a (integer)	Total yield of aftermath measured as for the first harvest
12	Dry matter ratio of foliage of aftermath	2 plots	Measurement	% (round to the 1st decimal place)	Dry matter ratio of fresh foliage of aftermath measured as for the first harvest
13	Dry matter ratio of head of aftermath	2 plots	Measurement	% (round to the 1st decimal place)	Dry matter ratio of fresh heads of aftermath measured as for the first harvest
14	Dry matter yield of foliage of aftermath	2 plots	Measurement	kg/a (round to the 1st decimal place)	Dry matter yield of foliage of aftermath calculated as for the first harvest
15	Dry matter yield of head of aftermath	2 plots	Measurement	kg/a (round to the 1st decimal place)	Dry matter yield of head of aftermath calculated as for the first harvest
16	Total dry matter yield of aftermath	2 plots	Measurement	kg/a (round to the 1st decimal place)	Total dry matter yield of aftermath calculated as for the first harvest
17	Yearly total fresh yield	2 plots	Calculation	kg/a (integer)	Total of fresh yield of each harvest for the year
18	Annual dry matter yield	2 plots	Calculation	kg/a (round to the 1st decimal place)	Total of dry matter yield of each harvest for the year

Plant	Sorghum	463	Tertiary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Sugar content of stem at the first harvest	5 plants, 2 plots	Measurement	% (round to the 1st decimal place)	Sugar content measured by Brix of internode sap in the middle of main stem or that of whole stem at harvest
2	Sugar content of stem of aftermath	5 plants, 2 plots	Measurement	% (round to the 1st decimal place)	Sugar content of aftermath measured as for the first harvest
3	Grain yield	2 plots	Measurement	kg/a (round to the 1st decimal place)	Yield of grains threshed and cleaned for grain type only
4	Dry matter digestibility	2 replications	Measurement	% (round to the 1st decimal place)	Ratio of digestible dry matter estimated by in vivo test or in vitro enzyme method or near infrared spectroscopy (NIRS)
5	Crude protein	2 replications	Measurement	% (round to the 1st decimal place)	Ratio of crude protein content on dry matter base analyzed by Kjeldahl method or near infrared spectroscopy (NIRS)
6	Acid detergent fiber (ADF)	2 replications	Measurement	% (round to the 1st decimal place)	Ratio of ADF content on dry matter base analyzed by acid detergent-acetone washing
7	Acid detergent lignin (ADL)	2 replications	Measurement	% (round to the 1st decimal place)	Ratio of ADL content on dry matter base analyzed by acid detergent-acetone washing
8	Neutral detergent fiber (NDF)	2 replications	Measurement	% (round to the 1st decimal place)	Ratio of NDF content on dry matter base analyzed by neutral detergent-acetone washing
9	Mono-and oligosaccharides	2 replications	Measurement	% (round to the 1st decimal place)	Ratio of mono-and oligosaccharide content on dry matter base analyzed by thin layer chromatography after ethanol extraction
10	Hydrocyanic acid	2 replications	Measurement	ppm (round to the 1st decimal place)	Hydrocyanic acid content on dry matter base analyzed by colorimetric analysis with alkali picrate solution

Plant	Sorghum	463	Tertiary optional character

No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
11	Nitrate nitrogen (NO3-N)	2 replications	Measurement	ppm (round to the 1st decimal place)	Nitrate nitrogen content on dry matter base analyzed by phenol di-sulfuric acid method
12	Intake	4 replications	Measurement	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Intake per unit time by grazing or free cafeteria feeding
13	Palatability	4 replications	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Palatability to cattle estimated by grazing or by free cafeteria feeding