

Plant		Alfalfa		38(06014)	Primary essential character
No	Characters	No. of samples	Methods	Rank or measurement unit	Remarks
1	Plant habit	10 plants, 2 replications	Observation	1:Erect 2:Nearly erect 3:Semi-erect 4:Slightly semi-erect 5:Intermediate 6:Slightly intermediate 7:Semi-prostrate 8:Nearly prostrate 9:Prostrate	Angles that outer stems make with the ground at flower budding stage
2	Plant height	10 plants, 2 replications	Measurement	cm (integer)	Plant height from the ground to the top of a plant at flowering stage
3	Stem thickness	10 plants, 2 replications	Measurement	mm (round to the 1st decimal place)	Diameter of stems in the middle of stem length
4	Leaflet length	10 plants, 2 replications	Measurement	mm (round to the 1st decimal place)	Length of the middle leaflet of the biggest leaf at flowering stage
5	Leaflet width	10 plants, 2 replications	Measurement	mm (round to the 1st decimal place)	Width of the middle leaflet of the biggest leaf at flowering stage
6	Blooming time	10 plants, 2 replications	Observation	date	Date when 50% of plants have begun to flower
7	Flower color	10 plants, 2 replications	Observation	1:White 2:Yellowish white 3:Yellow 4:Greenish yellow 5:Blueish purple 6:Red purple 7:Purple 8:Dark purple 9:Others	Color of flower petals observed soon after flowering

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No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Plant height at early stage	10 plants, 2 replications	Measurement	cm (integer)		Plant height within 2 months after sowing only when seeded in autumn
2	Sprouting date	10 plants, 2 replications	Observation	date		Date of the beginning of sprouting after overwintering in a cold region
3	Leaf color	10 plants, 2 replications	Observation	1:Extremely light green 2:Very light green 3:Light green 4:Slightly light green 5:Intermediate 6:Slightly dark green 7:Dark green 8:Very dark green 9:Extremely dark green		Leaf color at flower budding stage
4	Pubescence	10 plants, 2 replications	Observation	1:Very sparce 2:Very little 3:Little 4:Slightly little 5:Intermediate 6:Some 7:Much 8:Very much 9:Abundant		Amount of pubescences on stems
5	Pod shape	10 plants, 2 replications	Observation	1:None(sickle shape) 2:Very few 3:Few 4:Slightly few 5:Intermediate 6:Some 7:Many 8:Very many 9:Abundant		Number of spirals of pod after podding. Few:1, intermediate:<=3, many:>=5
6	Number of seeds per pod	10 plants, 2 replications	Measurement	Number of seeds/pod (round to the 1st decimal place)		Number of seeds per matured pod counted by sampling 10 pods per plant
7	1000 seeds weight	10 plants, 2 replications	Measurement	g (round to the 2nd decimal place)		Weight of 1000 seeds. Measured by sampling 100 clean seeds from the mixture of 20 plants with 4 replications
8	Variation in flower color	50 plants	Observation	1:Yellow 2:Yellow-slightly yellow 3:Slightly yellow 4:Mixture-Yellow 5:Mixture 6:Mixture-Purple 7:Slightly purple 8:Slightly purple-Purple 9:Purple		Variation in color of flower petals. Yellow:at least 98% of plants have yellow flowers, mixture:25-75% have purple flowers, purple:when at least 98% have purple flowers at flowering

Plant		Alfalfa		38(06014)	Secondary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Resistance to Leptosphaerulina leaf spot	20 plants, 2 replications	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 Leptosphaerulia briosiana based on the number of lesion spots on leaves
2	Resistance to spring black stem and leaf spot	20 plants, 2 replications	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 Ascochyta imperfecta based on the severity of lesions on stems and leaves
3	Resistance to blue alfalfa aphid	20 plants, 2 replications	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 Acyrthosiphon kondoi based on the number of aphids on a plant and the degree of wilting
4	Regrowth	20 plants, 2 replications	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly vigorous 7:Vigorous 8:Very vigorous 9:Extremely vigorous		Regrowth based on the herbage mass in one to three weeks after the first cutting
5	Plant vigor in spring	20 plants, 2 replications	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly vigorous 7:Vigorous 8:Very vigorous 9:Extremely vigorous		Regrowth based on the herbage mass 2 weeks after sprouting in early spring
6	Plant vigor in summer	20 plants, 2 replications	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly vigorous 7:Vigorous 8:Very vigorous 9:Extremely vigorous		Plant growth based on the herbage mass in mid summer
7	Plant vigor in autumn	20 plants, 2 replications	Observation	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly vigorous 7:Vigorous 8:Very vigorous 9:Extremely vigorous		Regrowth based on the herbage mass after cutting in autumn
8	Lodging resistance	20 plants, 2 replications	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		Degree of lodging observed at each cutting, especially when lodging occurred at the time of heavy herbage mass of the first or second harvest

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1	Viral disease resistance	20 plants, 2 replications	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 Alfalfa mosaic virus based on the degree of yellow lesions, discolored mottles or mosaic lesions on leaves after the first cutting	
2	Anthracnose resistance	20 plants, 2 replications	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 trifolii based on the number of mottles on leaves and stems and the frequency of dead plants	
3	Southern blight resistance	20 plants, 2 replications	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 Corticium rolfsii based on the degree of the infection on leaves and stems and the frequency of dead plants in summer	
4	Sclerotinia root rot and crown rot resistance	20 plants, 2 replications	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 Sclerotinia trifolii based on the degree of the infection on stems and the frequency of dead plants in early spring	
5	Root-knot nematode resistance	20 plants, 2 replications	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 nematode based on the number of club roots and the degree of growth inhibition in summer to autumn	
6	Bug resistance	20 plants, 2 replications	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 stick bugs based on the degree of damage to buds and fruits	
7	Tolerance to excess moisture	20 plants, 2 replications	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	Tolerance to excess moisture based on the growth inhibition and discoloration of leaves in the wet fields during or after rainy season	
8	Acid tolerance	20 plants, 2 replications	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	Acid tolerance based on the growth in soils with a pH of 5.0 or less	

Plant		Alfalfa		38(06014)	Tertiary essential character	
No	Characters	No. of samples	Methods	Rank or measurement unit		Remarks
1	Green yield in spring	2 plots	Measurement	kg/a (integer)		Total of green yield estimated from the fresh weight harvested from an area of 2 square meters per plot at each cutting in spring
2	Dry matter ratio in spring	2 plots	Measurement	% (round to the 1st decimal place)		Average ratio of dry matter measured by sampling 300 g of fresh sample and drying at 70 centi degrees for 48 hours at each cutting in spring
3	Dry matter yield in spring	2 plots	Calculation	kg/a (integer)		Total of dry matter yield calculated by green yield x dry matter ratio/100 at each cutting in spring
4	Green yield in summer	2 plots	Measurement	kg/a (integer)		Green yield in summer estimated in the same way as that of spring
5	Dry matter ratio in summer	2 plots	Measurement	% (round to the 1st decimal place)		Dry matter ratio in summer measured in the same way as that of spring
6	Dry matter yield in summer	2 plots	Calculation	kg/a (integer)		Dry matter yield in summer calculated in the same way as that of spring
7	Green yield in autumn	2 plots	Measurement	kg/a (integer)		Green yield in autumn estimated in the same way as that of spring
8	Dry matter ratio in autumn	2 plots	Measurement	% (round to the 1st decimal place)		Dry matter ratio in autumn calculated in the same way as that of spring
9	Dry matter yield in autumn	2 plots	Calculation	kg/a (integer)		Dry matter yield in autumn calculated in the same way as that of spring

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1	Leaf ratio	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Average ratio of the dry weight of leaves to the total dry weight measured by sampling 20 g of fresh weight at each cutting
2	Dry matter digestibility	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Ratio of digestible dry matter analyzed by in vivo test or in vitro enzyme method
3	Crude protein content	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Ratio of crude protein content on a dry matter base analyzed by Kjeldahl method or Near Infra-red Analyzer
4	Acid detergent fiber (ADF)	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Ratio of ADF content on a dry matter base analyzed by acid detergent-acetone washing
5	Neutral detergent fiber (NDF)	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Ratio of NDF content on a dry matter base analyzed by neutral detergent-acetone washing
6	Acid detergent lignin (ADL)	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Ratio of ADL content on a dry matter base analyzed by acid detergent-acetone washing
7	Mono-and oligosaccharids	2 plots, 3 replications	Measurement	% (round to the 1st decimal place)	Ratio of mono-and oligosaccharid content on a dry matter base analyzed by the thin layer chromatography after alcohol extraction
8	Saponin	2 plots, 3 replications	Measurement	% (round to the 2nd decimal place)	Ratio of saponin content on a dry matter base analyzed by the thin layer chromatography after ethanol extraction
9	Persistency	2 plots, 2 replications	Obs.&Measr.	1:Extremely poor 2:Very poor 3:Poor 4:Slightly poor 5:Intermediate 6:Slightly good 7:Good 8:Very good 9:Excellent	Persistency based on the degree of decrease of annual yield after sowing or the ratio of remaining plants at the last cutting of each year
10	Number of racemes	10 plants, 2 replications	Observation	1:None or almost none 2:Extremely few 3:Very few 4:Few 5:Intermediate 6:Some 7:Many 8:Very many 9:Extremely many	Number of racemes at flowering stage or the first cutting

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11	Seed weight per flower	10 plants, 2 replications	Measurement	mg (integer)	Pure seed weight per plant measured by sampling 20 racemes