

Forage Yield Testing Guidelines

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ESTABLISHMENT

Seed and seed treatment: Commercial seed should be planted as received from the supplier. Seed treatment for experimental entries can be applied at the discretion of the tester and reports should indicate treatments that are applied.

Only commercial seed should be used for testing of released varieties. Experimental and commercial varieties may be tested within the same experiment but results should be reported separately.

Site selection: Select sites with uniform soils and topography.

Soil fertility: Soil pH and fertility (P, K, and micronutrients) should meet or exceed recommended levels for the region.

Stands: Uniform stands should be established in rows (12 inches or less apart) or by broadcasting to provide a minimum of 20 plants/ft² in the seeding year. If data from tests with sub-standard plant populations are used, stand density should be noted.

Plot size: Minimum of 3 to 5 feet wide by 12 to 25 feet long.

Borders: Areas of at least 3 feet around tests. Individual plots do not need border areas.

CULTURE

Irrigation: Not required, but if applied, irrigation should be uniform and irrigation strategy and amount applied noted.

Pest control: Alfalfa should be scouted and insecticides and herbicides should be applied when needed. Insecticide and herbicide application should be noted in reports. In particular, grass and other weeds should be controlled so that only alfalfa yield is reported.

HARVESTING

Harvest scheduling: Schedule by stage of maturity, such as first flower, or by date. Harvest schedules should be similar to those commonly used in the testing region. When reporting data, provide information on harvest scheduling criteria, seasonal harvest number, and maturity at harvest.

Stubble height: 2 to 3 inch minimum.

Harvest area: Minimum of 2 feet wide, 3 feet wide preferred, by 12 to 25 feet long. The entire plot can be harvested.

Harvest equipment: Sickle bar or flail mower.

Dry matter determination: Subsamples should be clipped from standing forage or hand grabbed from harvested materials. Minimum sample size should be about 300 g wet weight. With uniform soil

moisture and growing conditions, about 5% of the entries per trial should be sampled with a minimum of 5 samples collected. When wide dormancy and/or maturity stages differences exist among entries, increase the number of sub-samples. Dry samples at 140° F in a forced air oven for about 48 hours. Cloth bags, perforated paper bags, or trays can be used for drying of forage.

Weed invasion: Sometimes, persistent weeds may invade alfalfa trials despite best weed control efforts. Weed invasion in these trials should be quantified and reported.

DATA ANALYSIS AND STATISTICS

Experimental designs:

Experimental design will vary with experiences of the investigator and natural variability of the plot area. The following designs are recommended:

- Randomized complete block design with trend analysis of the data.
- Lattice or incomplete block design.
- Systematic control design.

Replication:

Varieties and experimental entries within a trial should be replicated a minimum of 4 times per location; however, replication number should increase if conditions at a site are highly variable.

For evaluation of entry performance, trials should be conducted at a minimum of two environments within a state or region.

Rejection tests:

The use of results from tests should be evaluated based on biological and statistical criteria.

- Biological criteria include inadequate stands and extreme variability in alfalfa growth within a study due to environmental conditions and pests.
- Statistical criteria should be based on a statistically significant ($P = 0.05$) ANOVA. If the statistical test is not significant, as can occur in some instances with alfalfa stands meeting all biological criteria, results are acceptable if the CV is not greater than 5% units above the regional or state long-term CV mean. Usually, acceptable tests have CV values of less than 12%.

PUBLICATION OF DATA

Data from seeding and production years should be reported. Investigators should provide the following statistics for comparison of data and to measure the variability within a trial: LSD (Least Significant Difference at 0.05 level), CV (Coefficient of variation), P value of the entry mean

square F-test, LSR [100(LSD)/Range], R^2 (r-square of the ANOVA model)

Data collected from experimental alfalfa populations will not be distributed to the public. These data will be distributed through documents like the annual CAIC Variety Tests publication that is identified as **Not For Publication**.

Data on experimental populations that are named for release to farmers may be published, but only if the newly named variety is entered again in the same University Variety Trials using commercial seed.

Data collected from experimental seed should be deleted from published data after 2 years of data are collected from commercial seed.

CHECK ENTRIES

Check entries provide an important benchmark for current and future yield testing. All trials should include check entries that are appropriate for a region. There are no universal check varieties appropriate for inclusion in all trials within North America.

HELPFUL INFORMATION

These guidelines provide an opportunity for modification of techniques and check varieties according to state and regional variation in environmental conditions and routine practices. The impact of alternative testing procedures on statistical measures of variability should be considered.

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