

MULTIFOLIOLATE LEAF EXPRESSION (LEAVES WITH GREATER THAN 3 LEAFLETS/LEAF)

Test accepted: March 1995

Test updated: August 2020

Test authors: C.C. Sheaffer, M. McCaslin, J.J. Volenec, J.H. Cherney, K.D. Johnson, W.T. Woodward, and D.R. Viands

FIELD ESTABLISHMENT

SeedingPlants should be established in rows using transplants (8-12 week old) or by direct seeding and thinning. Procedures for greenhouse culture of plants for transplanting are provided in the procedures for fall dormancy determination (see fall dormancy testing procedures, Reference 1).

Spacing30 cm between plants in rows 0.6 to 1.0 m apart.

No. of Plants25 per replication

No. of Reps4 minimum

OtherMaintain a high soil fertility, a soil pH of 6.5 to 7.5, and adequate soil moisture. Minimize weed and insect interference. Inoculate with *Sinorhizobium meliloti*.

RATING

Clip herbage using locally accepted schedules and rate plants when vegetative in late summer. Multifoliolate leaf (MF) expression on a per plant basis is visually scored. The multifoliolate leaf expression score per plant is based on an average of individual stems and on number of MF leaves per stem:

Score	Description
0	= all trifoliolate leaves
1	= 1 MF leaf/stem
2	= 2-3 MF leaves/stem
3	= 4-5 MF leaves/stem
4	= 6-7 MF leaves/stem
5	= 8+ MF leaves/stem

CALCULATIONS

MF Expression IndexA multifoliolate expression index (MFI) is calculated as the sum of the product of the number of plants which are in each MF category over the total number of plants scored.

$$\text{MFI} = \frac{[(\text{number score } 1 * 1) + (\text{number score } 2 * 2) + (\text{number score } 3 * 3) + (\text{number score } 4 * 4) + (\text{number score } 5 * 5)]}{\text{Total number of plants scored}}$$

Both the MFI value and the percentage of plants with MF expression (those plants scoring 1 to 5) should be provided when describing experimental germplasm and cultivars.

CHECK CULTIVARS

Category	Cultivar	MFI	Acceptable Range
Trifoliolate	Vernal	1.00	1.00-1.05
Low MF	Legend	1.86	1.40-2.40
Moderate MF	MultiKing I	2.55	2.00-3.00
High MF	Proof	3.35	2.80-3.80

SCIENTISTS WITH EXPERTISE

Craig C. Sheaffer

University of Minnesota

Dept of Agronomy and Plant Genetics

411 Borlaug Hall

St.Paul,MN 55108

(612) 625-7225

J. J. Volenec

Purdue University

Department of Agronomy

Lilly Hall of Life Sciences

West Lafayette, IN 47907

(317) 494-8071

REFERENCES

1. Teuber, L.R., K.L. Taggard, L.K. Gibbs, M.H. McCaslin, M.A. Peterson, and D.K. Barnes. 1998. North American Alfalfa Improvement Conference. <https://www.naaic.org/stdtests/updated/pdfs/FallDormancy.pdf>.
2. Juan, N.A., C.C. Sheaffer, and D.K. Barnes. 1993. [Temperature and photoperiod effects on multifoliolate expression and morphology of alfalfa](#). Crop Sci. 33:573-578.
3. Etzel, M.G., J.J. Volenec, and J.J. Vorst. 1988. Leaf morphology, shoot growth, and gas exchange of multifoliolate alfalfa phenotypes. Crop Sci. 28:263-269.
4. Volenec, J.J., and J.H. Cherney. 1990. [Yield components, morphology, and forage quality of multi- foliolate alfalfa phenotypes](#). Crop Sci. 30:1234-1238.
5. Pecetti, L., P. Annicchiarico, C. Scotti, M. Paolini, V. Nanni, and A. Palmonari. 2017. [Effects of plant architecture and drought stress level on lucerne forage quality](#). Grass and Forage Science, 72(4), pp.714-722.
6. Juan, N.A., C.C. Sheaffer, D.K. Barnes, D.R. Swanson, and J.H. Halgerson. 1993. [Leaf and stem traits and herbage quality of multifoliolate alfalfa](#). Agronomy J. 85: 1121-1127.