November 2003 (New Pending Approval)

Winter Survival

Mark McCaslin, Tim Woodward, and Dan Undersander

PLANT CULTURE

Greenhouse

Container.....Bench, flat,or pot deep enough to allow root development
Media.....Sand, soil or potting mix
Temp/light .....24 to 30°C; 16+ hr daylength
No. of plants ...25+ per replication
No. of reps .....3 to 6 replications
Other.....Spray and fertilize as necessary

FIELD ESTABLISHMENT

Location.....Transplant 8-12 week old plants to the field in late May or early June; direct seeding with hand thinning also acceptable
Spacing.....0.3 to 0.4m x 0.6 to 1.0m
Culture.....Maintain vigorous growth, control weeds and insects
Test length .....Scores recorded in the spring, one year after establishment
Plant counts ....Plant counts should be taken after last cut prior to first severe frost
Test location ...Test sites should be limited to areas where the check varieties in classes 5-6 are dead or severely injured and where there will be clear differences between check varieties in class 2 vs. class 4.

CLIPPING MANAGEMENT

Nurseries should be intensively managed in the establishment year. They should be clipped at early to mid bud stage with a final clipping in mid September in MN or WI. Under this cutting regime the plant enters the winter in a stressed condition, allowing for more consistent winter injury in moderate winters. Local experience will provide information on which clipping dates provide the greatest separation among varieties.

RATING

1. No injury, plant has uniform, symmetrical appearance, all shoots are about equal in length
2. Some injury, the plant is symmetrical, but regrowth is slightly uneven
3. Significant injury, regrowth varies in length, reduced vigor
4. Severe injury, plant has sparse shoots, regrowth is very irregular, poor vigor
5. Dead plant

An average score (ASI) can be calculated for each cultivar. A winter survival rating (1-6) can be assigned based on the ASI relative to the standard check cultivars.

CHECK CULTIVARS

Variety	Winter Survival rating	Typical ASI
ZG 9830	1	1.6
5262	2	2.2
WL325HQ	3	2.9
G-2852	4	3.6
Archer	5	4.0
Cuf 101	6	4.8

SCIENTISTS WITH EXPERTISE

Name.....Mark McCaslin
Address .....Forage Genetics International
P.O. Box 415
Prior Lake MN 55372
Email.....mccaslin@forage-genetics.com

Name.....Tim Woodward
Address .....Washington State University
Franklin County Courthouse
1016 N 4th
Pasco WA 99301-3706
Email..... woodward @wsu.edu

Name.....Dan Undersander
Address .....Department of Agronomy
1575 Linden Drive
Madison WI 53706
Email.....djunders@facstaff.wisc.edu

HELPFUL INFORMATION

A minimum of two location years is required for this test because of possible variation in the nature of winter injury over years and locations.

A successful test must show a significant difference (p=.95) between the class 2 and class 4 check cultivars. The class 6 checks must have an ASI of 4.6 or higher.

Care should be taken to read the winter survival test after all the plants have broken dormancy. Readings taken too early may underestimate winter survival in some dormant lines.

Degree of severity of this test may be increased by snow removal (2).

REFERENCES

1. Knipe, W.C., C. Fox, F. Stanley, and J. Magsam. 1989. Relationship between cold injury and fall growth in alfalfa. Proc. 21st Central Alfalfa Imp. Conf. p.26

2. McKensie, J.S. and J.G.N. Davidson. 1984. A stress test for assessing the winterhardiness of alfalfa in nortwestern Canada. Can. J. of Plant Sci. 64:917-924.

3. Peterson, M, D. Barnes, W. Knipe, M. McCaslin, J. Moutray, D. Viands, and T. Woodward. 1989. A seven location study of the relationship between fall dormancy and winterhardiness in alfalfa. Proc. 21st Central Alfalfa Imp. Conf. p22-23.

4. Sulc, R.M., K.A. Albrecht and S.H. Duke. 1989. Cold tolerance of nine alfalfa cultivars varying in degree of fall dormancy. Proc. 21 st Central Alfalfa Improvement Conf. p24-25.