

Introduction

- ◆ Leadplant (*Amorpha canescens* Pursh.) is a small leguminous shrub native to the prairies and plains of the USA where it is a valuable forage species.
- ◆ Seed of leadplant is in high demand for reseeding grasslands to native species.
- ◆ Currently, released cultivars and source identified germplasms are not available for commercial seed production.

PAR nursery 332-HZ5a in bloom, Mead, Nebraska, 2007.



Objectives

- ◆ Create Plant Adaptation Region (PAR) populations from accessions collected which will be representative of the genetic diversity of leadplant in these geographical areas.
- ◆ Characterize genetic variability among accessions within and among PAR nurseries for phenological development using growth stage analyses.
- ◆ Determine variation among accessions for seed yield and seed viability (not presented in this report).

PAR nursery 251-HZ4b in late bud, Mead, Nebraska, 2007.



Materials & Methods

- ◆ Seeds were collected from native prairies in the Midwest & Central Plains in 1999 & 2000.
- ◆ Accessions were separated into Plant Adaptation Region (PAR) nurseries or populations by PAR origin.
 - PARs are geographical areas defined by combining Ecoregions & USDA Plant Hardiness Zones (Vogel, et al. 2005).
- ◆ In addition, each PAR was divided into north & south sections denoted by "a" & "b".
- ◆ Seedlings of each accession were grown in the greenhouse & transplanted into field nurseries between 2002 & 2005.
- ◆ Single row plots of 10 plants were planted with plants spaced 30 cm apart within rows. Rows are 1.1 m apart.
- ◆ 10 growth stages were adapted from Kalu & Fick (1981).
- ◆ For the 62 accessions evaluated, the day when the first & last plant in a plot reached a certain growth stage was recorded.
- ◆ In addition, seed was hand harvested from each plot to determine yield and viability.

Leadplant Growth Stages

- ◆ 0 - Green-up or Early Vegetative
- ◆ 1 - Mid-Vegetative
- ◆ 2 - Late Vegetative
- ◆ 3 - Early bud
- ◆ 4 - Late bud
- ◆ 5 - Early flower
- ◆ 6 - Late flower
- ◆ 7 - Early seed pod
- ◆ 8 - Late seed pod
- ◆ 9 - Ripe seed



Growth Stage 0 - Green-up.



Growth stage 5 - Early Flower



Growth stage 6 - Late flower



Growth Stage 9 - Ripe seed.

Results & Discussion

- ◆ Significant diversity exists for the growth stages observed among accessions within and among PAR nurseries.
- ◆ This information can be used in conjunction with the seed yield data to select accessions exhibiting traits conducive to superior seed production.
- ◆ Methods used to evaluate the growth stages in leadplant may now be useful in characterizing the phenological development of other native shrubs.

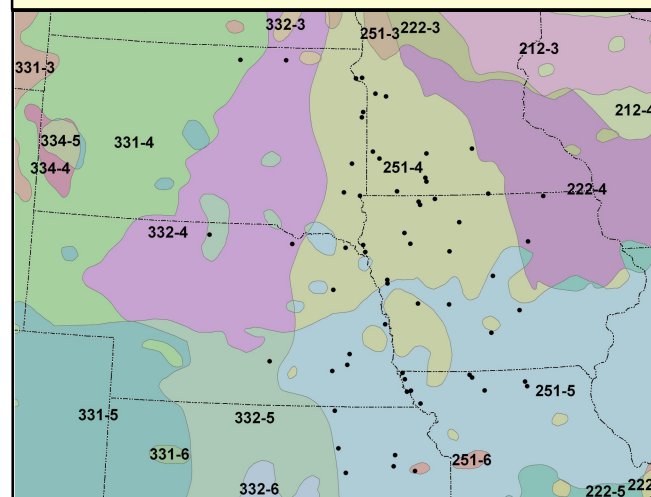


Variation in flowering date of one plot in PAR nursery 332-HZ5a (left).

Day of the Year for the first plant in a plot to reach three growth stages.

Plant Adaptation Region (PAR) Nursery	Year	Green-up Mean (SD) Range	Early Bud Mean (SD) Range	Early Flower Mean (SD) Range
251-HZ4a (n=10, r=5)	2006	118 (4.2)	144 (2.0)	162 (2.2)
	2007	121 (2.2)	141 (2.5)	161 (2.9)
251-HZ4b (n=24, r=5)	2006	119 (3.7)	147 (2.5)	164 (2.3)
	2007	124 (2.0)	142 (3.1)	165 (3.2)
251-HZ5a (n=15, r=4)	2006	119 (4.5)	146 (2.8)	165 (3.2)
	2007	124 (1.7)	139 (3.0)	168 (2.9)
251-HZ5b (n=7, r=5)	2006	119 (4.3)	147 (3.1)	165 (2.9)
	2007	123 (2.2)	142 (3.5)	166 (2.8)
332-HZ5a (n=6, r=5)	2006	118 (3.4)	147 (2.9)	164 (2.6)
	2007	123 (2.0)	141 (3.2)	168 (2.8)

Locations of leadplant seed collection by Plant Adaptation Region (PAR).



References

- Kalu, B.A., and G.W. Fick. 1981. Quantifying morphological development of alfalfa for studies of herbage quality. *Crop Sci.* 21:267-271.
- Vogel, K.P., Brejda, J.J., Schmer, M.R., Mitchell, R. 2005. Plant adaptation regions: ecological and climatic classification of plant germplasm. *Rangeland Ecology and Management* 58:315-319.
- Photos by Courtney Schuler