Maryland Native Warm-Season Grass Management Trial Final Report

INTRODUCTION

Wildflowers are food for insect larvae and provide pollen and nectar to pollinators. A diverse mix of wildflowers with blooms throughout the growing season is especially valuable to pollinators while supporting populations of beneficial insects, such as those that prey on crop pests. Wildflowers in grass plantings provide a varied food source and structural complexity to support a diverse community of birds, mammals and insects.

Native warm-season grasses (NWSG) can come to dominate conservation plantings, resulting in limited plant species diversity, lack of structural complexity and a compromised ability to support diverse wildlife. Maryland NRCS is working to increase the wildflower diversity in its conservation plantings and thereby increase the ability of these plantings to support greater wildlife diversity.

This study was implemented to determine the optimal methods for renovating warm-season grass stands to increase diversity and improve wildlife habitat. The study was conducted at the National Plant Materials Center in Beltsville, Maryland (NPMC) in cooperation with Maryland NRCS State Biologist Steve Strano.

Evaluated in this study are the effectiveness of disturbance treatments of various timings and intensities, and the establishment of new Maryland wildflower mixes over-seeded at several seeding rates into two NWSG stands with different species composition, thickness and soil type.

Technical products informed by this study include new and/or revised seeding recommendations for NRCS programs, technical notes and fact sheets.

EXPERIMENTAL DESIGN AND CONDUCT

Two separate treatment areas, Area 1 (located at Locust Field, NPMC) and Area 2 (located at C2, NPMC), with different soils and existing plant compositions were utilized for the study. Area 1 (“dry’) is on a well-drained site with soil dominated by indiangrass and received the “dry” wildlfower mix treatments. Area 2 (“mesic”) is a mesic site with soil dominated by warm-season grasses and received “mesic” wildlfower mix treatments. All study plots were evaluated for percent cover of existing vegetation and open ground before and after treatment application. Percent cover visual estimations were taken by both authors and combined for each response value evaluated and recorded as percent cover class ratings. The treatments for the two trials were identical except for species mix used which is tailored to the trial site soil conditions. Each combination of treatments was replicated twice in each treatment area. Plot size was 10 feet × 12 feet. No fertilizer was applied to the plots.

Treatments:

A. Time of mowing/disking effects (T)
   - Late summer – mow and disk (September, 2008)
   - Late summer mow – fall (dormant) disk (November, 2008)
   - Fall (dormant) mow (November, 2008) – spring disk (March, 2009)
   - Late winter/early spring – mow and disk (March, 2009)

B. Intensity of disking effects/percent bare ground (D = Disk)
   - 25 percent bare ground
   - 50 percent bare ground
   - 100 percent bare ground
   - No disk (control)

C. Overseeding
   - None - Control (x)
   - ½ pound PLS per acre rate (w)
   - ½ pound PLS per acre rate with small grain nurse crop (oats at 20 pounds per acre) (g)
   - 4 pounds PLS per acre rate (c)

Wildflower Mixes:

- Area 1: Indiangrass plot – Use Maryland native wildflower mix for dry sites (Jan 2008)
- Area 2: Warm-season grass plot – Use Maryland native wildflower mix for mesic sites (Jan 2008)

Response Evaluation:

The following responses were evaluated for a period of three years:

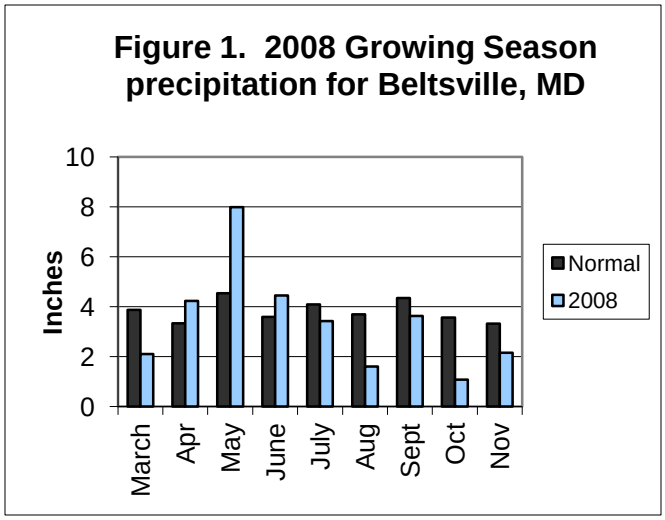
A. Percent cover (based on cover classes)
   - Total
   - Desirable grasses
   - Desirable forbs
   - Weeds – any problematic species
   - Litter (based on what is visible)
   - Bare ground (based on what is visible)

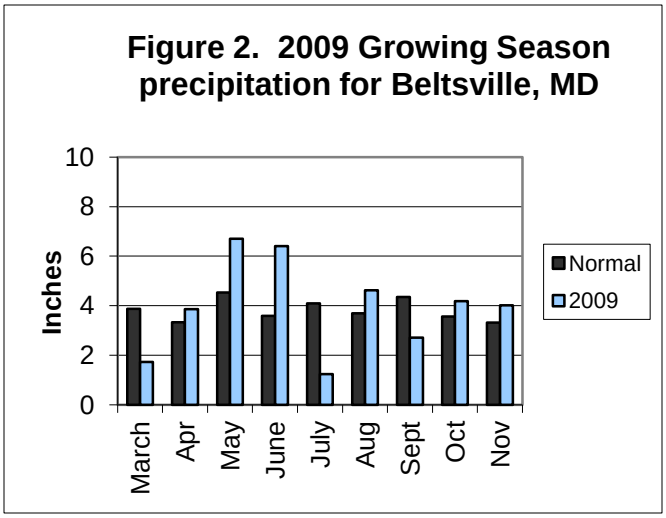
B. Litter depth (based on depth classes, using most representative depth class for plot)

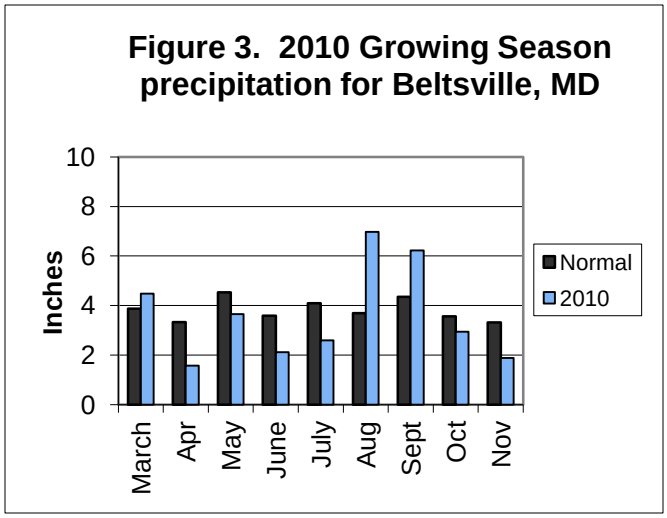
C. Vegetative composition (species)

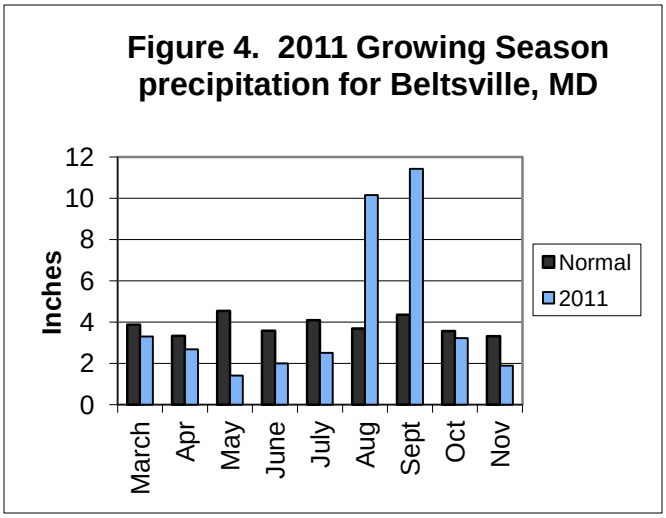
PRECIPITATION

The precipitation amounts by monthly total for the trial period growing seasons are reported in Figures 1 through 5. Precipitation in the 2011 growing season was well below average in May, June and July, and was well above average in August and September. Precipitation in the 2010 growing season was below average in all months except March, August and September. Precipitation in the 2009 growing season was above average in all months except for March, July and September. Precipitation in 2008 was above average for April, May and June, but below average in July, August, and September.









INTERPRETING DATA

Data presented in Figures 5 through 14 can be used to evaluate the relative performance of the treatments evaluated in this study. The study design allowed for a large number of variables to be evaluated at one time, but the study was not designed for planned statistical comparisons.

RESULTS AND DISCUSSION

After 3 seasons of post treatment data collection concluding in 2011 the data indicates the following:

1) The fall disking treatments had the greatest reductions in NWSGs and improvements to forb establishment that were still measurable three seasons after treatment. NWSGs disked in the late summer and fall had less cover than NWSGs disked in spring after 3 seasons, especially on the dry site. This suggests that NWSGs may be more susceptible to critical damage when disked in the late summer and fall, or alternatively, spring disking may have a positive effect on NWSGs. Although the difference in percent cover of NWSGs between fall and spring disk was more pronounced in the 100% bare ground disking treatment than in the 25% and 50% disking treatments, the timing of the disking treatment was more important. Spring disking is not very effective at persistently reducing cover of well-established, tall-statured NWSGs.

2) Intensity of disking made only a small difference overall in persistent reductions of grass cover or improvement in establishment of forbs. Temporary reductions in grass cover did allow some establishment of forbs.

3) Disking was shown to be somewhat more effective at reducing cover of tall-statured NWSGs in the site with more well-drained soils (i.e. dry site) with predominately indiangrass as the primary NWSG. Plots at this site had indiangrass cover reduced whereas the switchgrass and big bluestem cover remained the same or increased, suggesting that indiangrass is more susceptible to damage by disking.

4) Larger scale evaluations should be conducted to determine the most effective and efficient methods for reducing the NWSG cover in established stands. In addition to disking, other methods and degrees of disturbance should be evaluated, including plowing and herbicide treatment.

5) The timing of disturbance to NWSGs should be evaluated further. Currently, the most common time for disking and burning NWSGs is in the early spring, because it is more convenient for managers, and it leaves wildlife cover standing through the winter. If fall disturbance is more effective, then current management practices will need to be re-evaluated.

6) Wildflower establishment was affected more by species than any other variable. Many wildflowers species were not found in any of the plots whereas a few were commonly found as shown in figures 13 and 14. The more commonly found species may be more suitable for use in wildflower mixes designed for enhancing diversity in NWSG stands.

Figure 5: Comparison of mean percent cover for the "dry" site, 3 seasons after treatments.

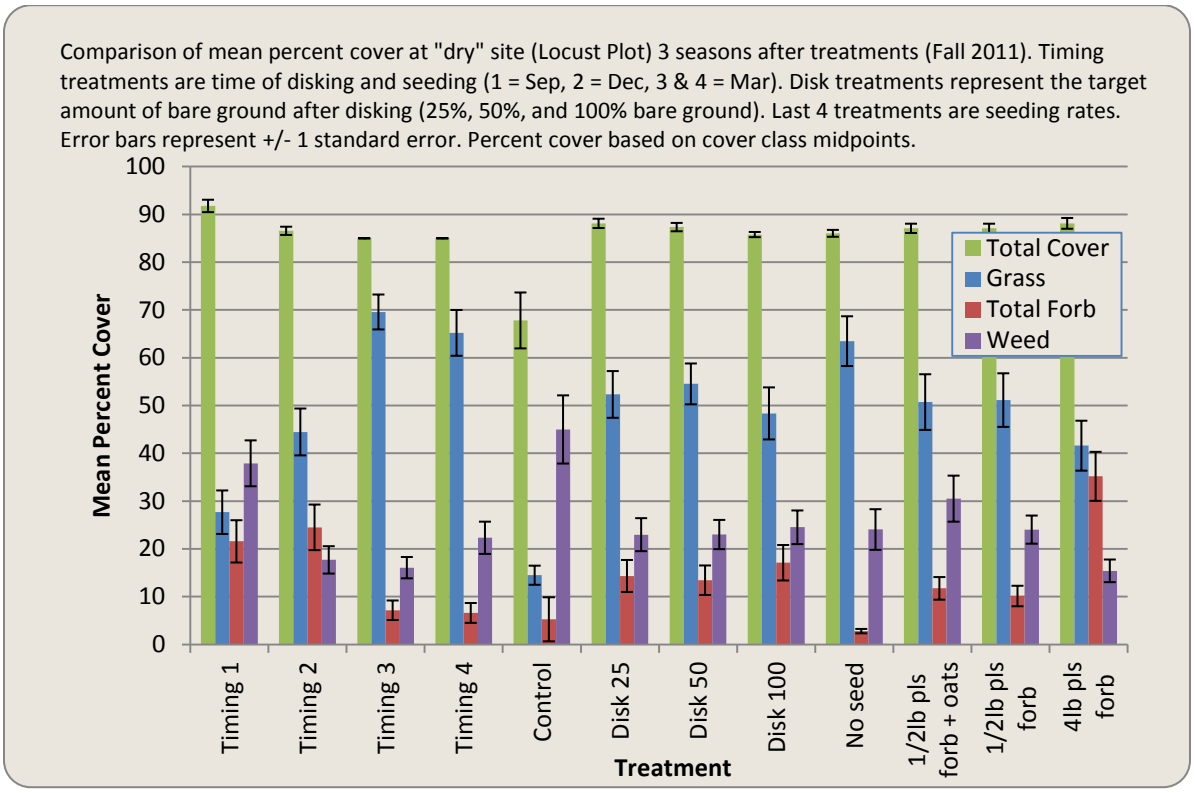


Figure 6: Comparison of mean percent cover for the "mesic" site, 3 seasons after treatments.

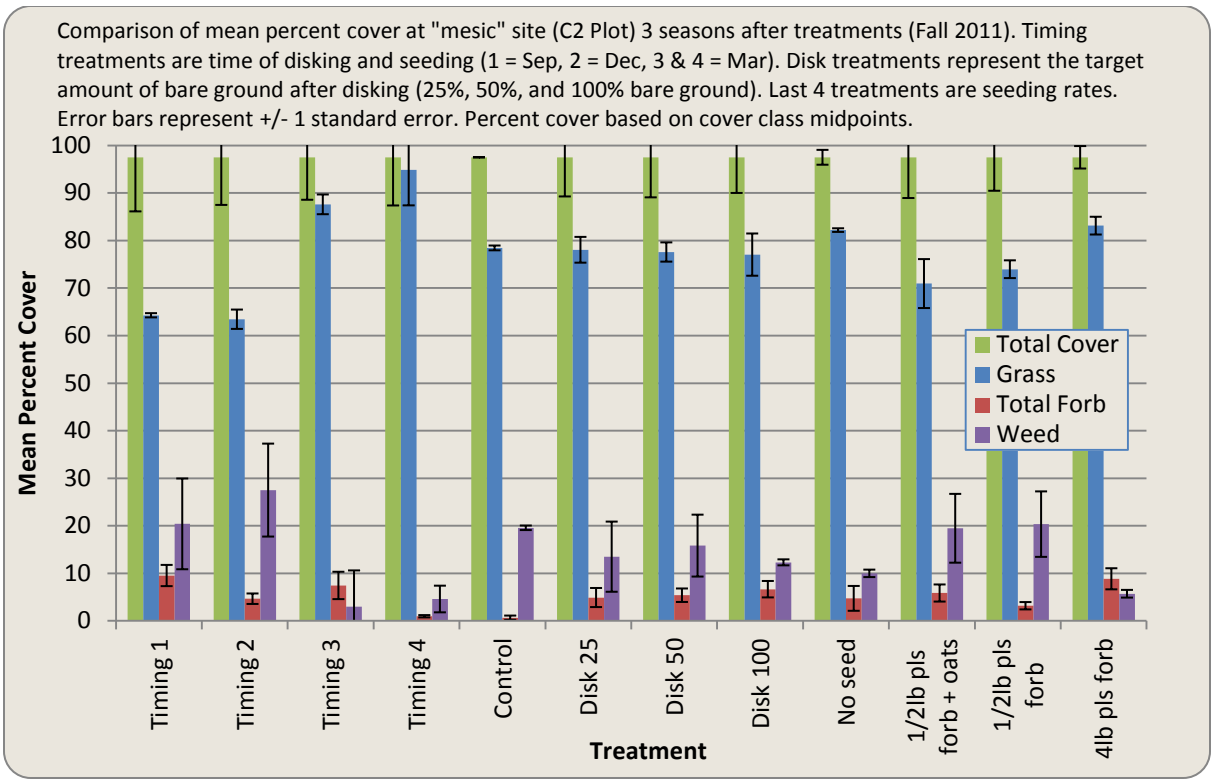


Figure 7: Comparison of mean percent grass cover at the "dry" site over 4 year evaluation period.

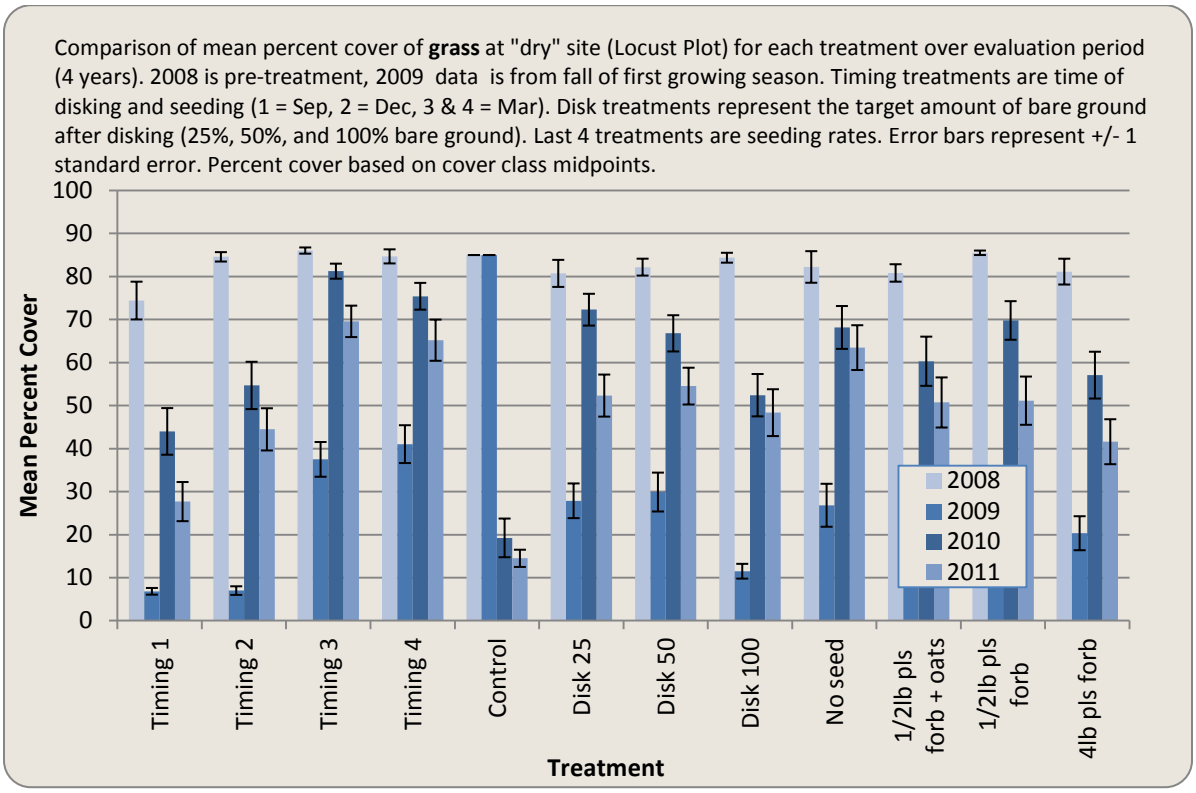


Figure 8: Comparison of mean percent grass cover at the "mesic" site over 4 year evaluation period.

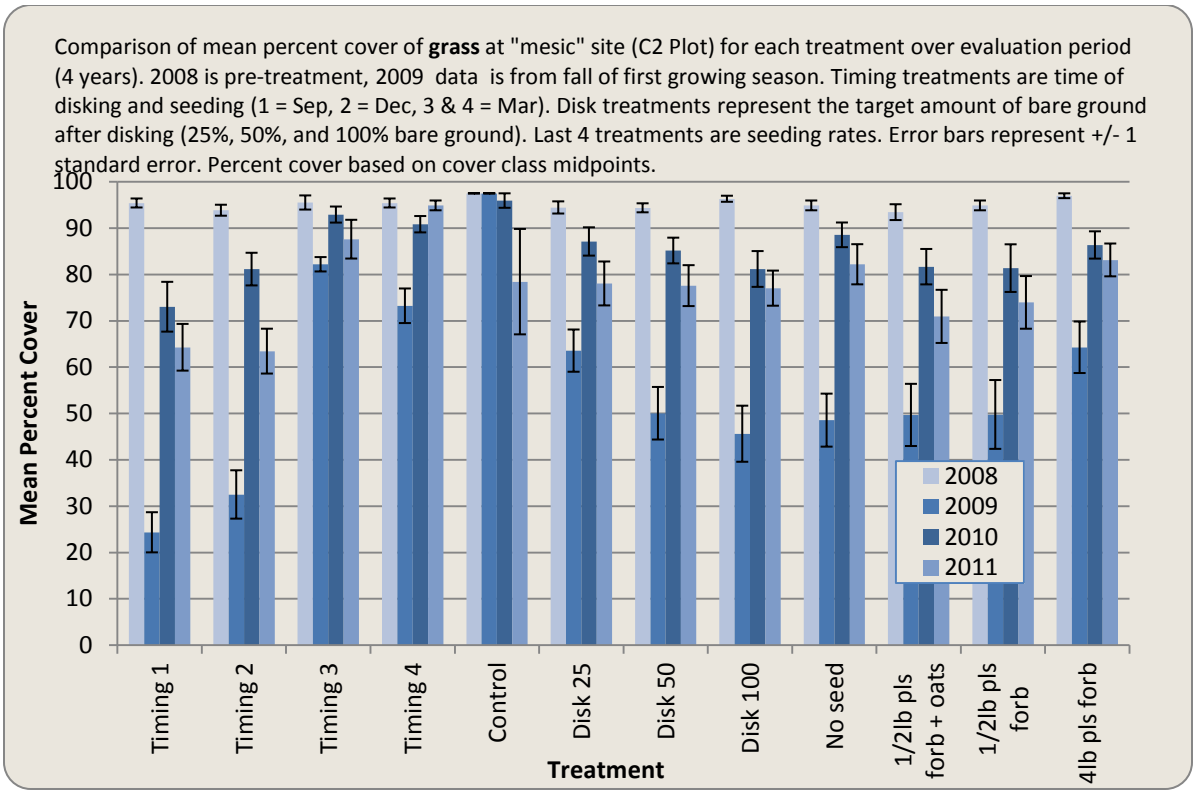


Figure 9: Comparison of mean percent forb cover at the "dry" site over 4 year evaluation period.

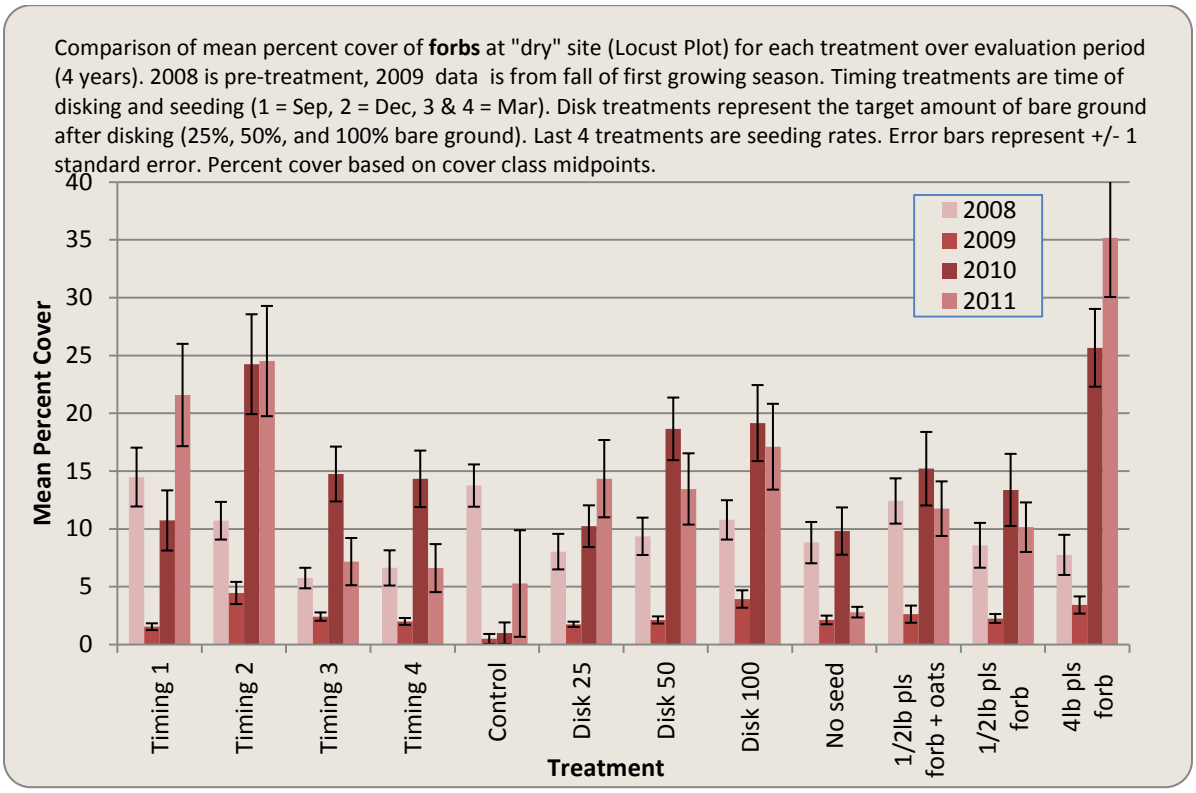


Figure10: Comparison of mean percent forb cover at the "mesic" site over 4 year evaluation period.

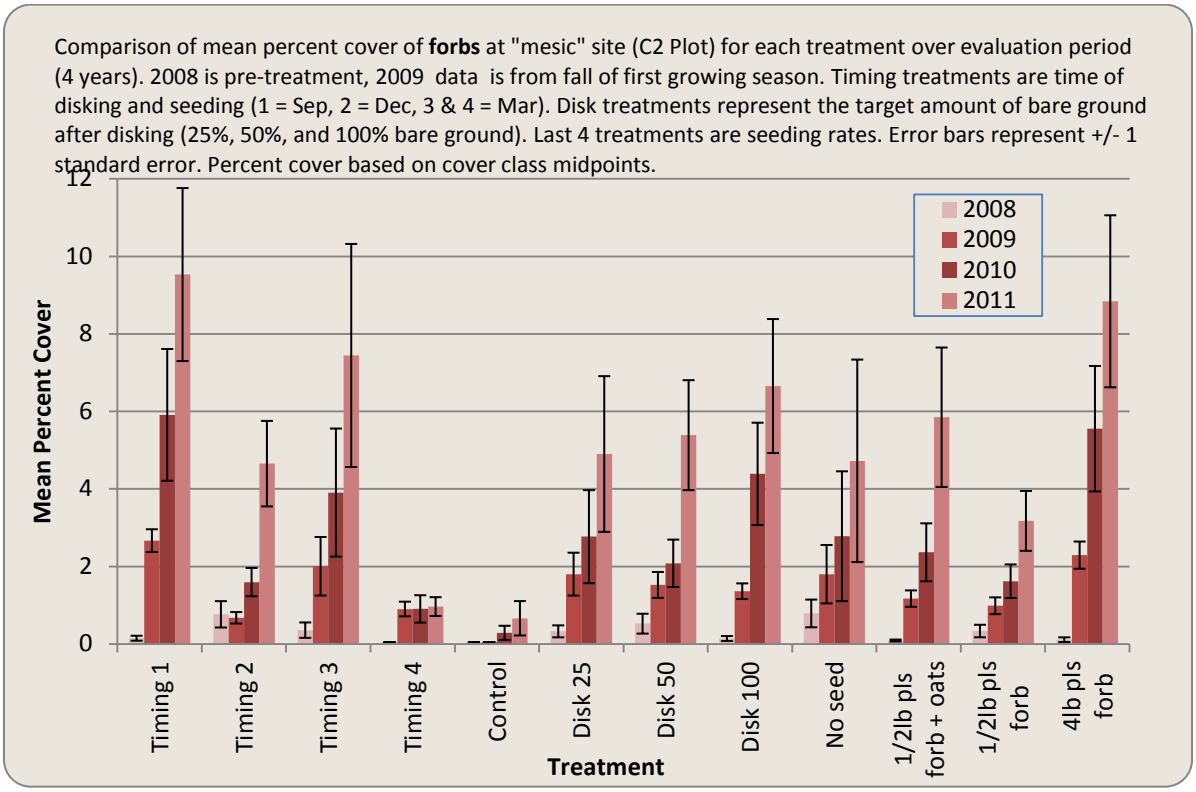


Figure 11: Comparison of mean percent weed cover at the "dry" site over 4 year evaluation period.

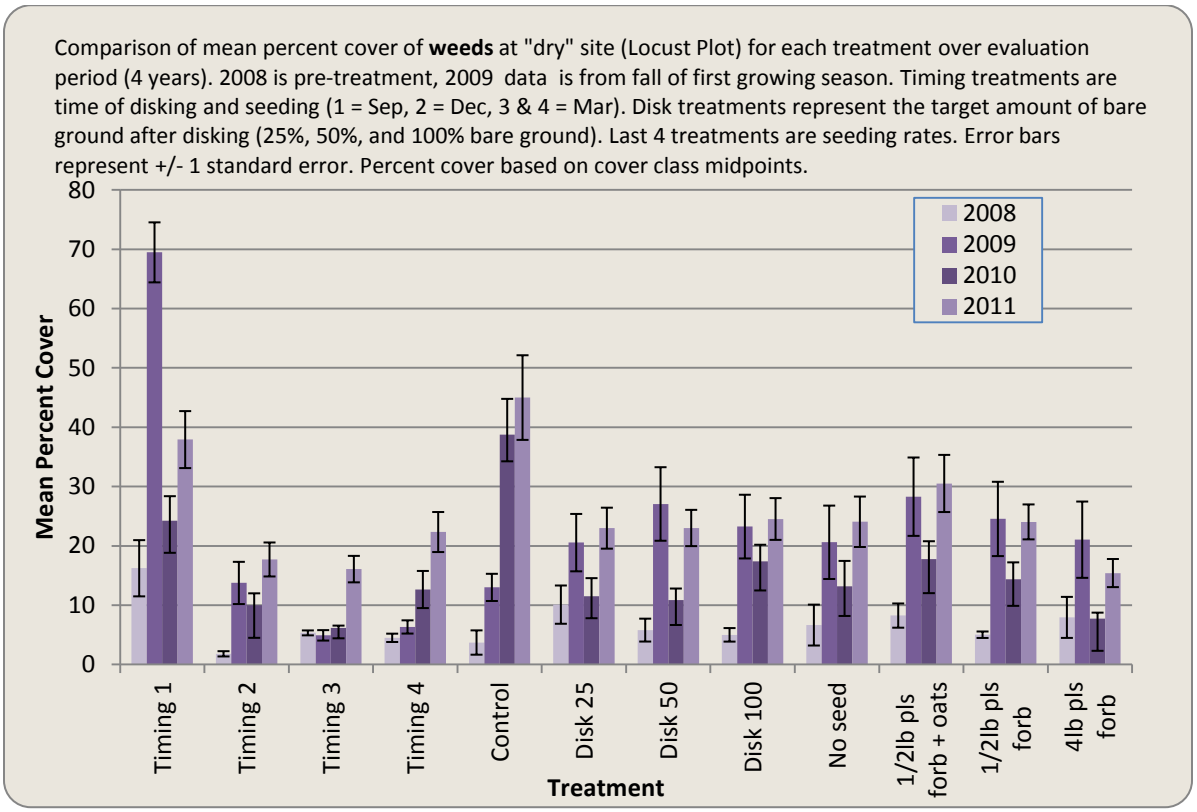


Figure 12: Comparison of mean percent weed cover at the "mesic" site over 4 year evaluation period.

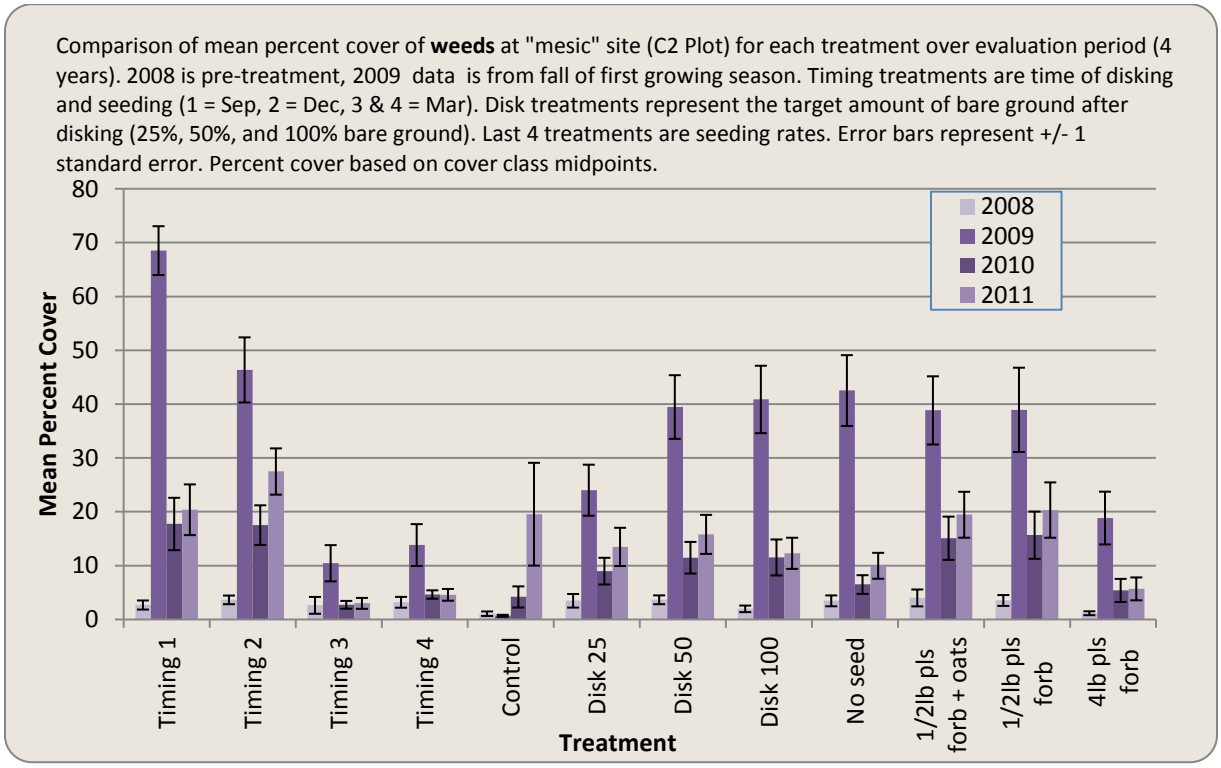


Figure 13: Forb species mean percent cover at the "dry" site, 2 and 3 growing seasons after treatment.

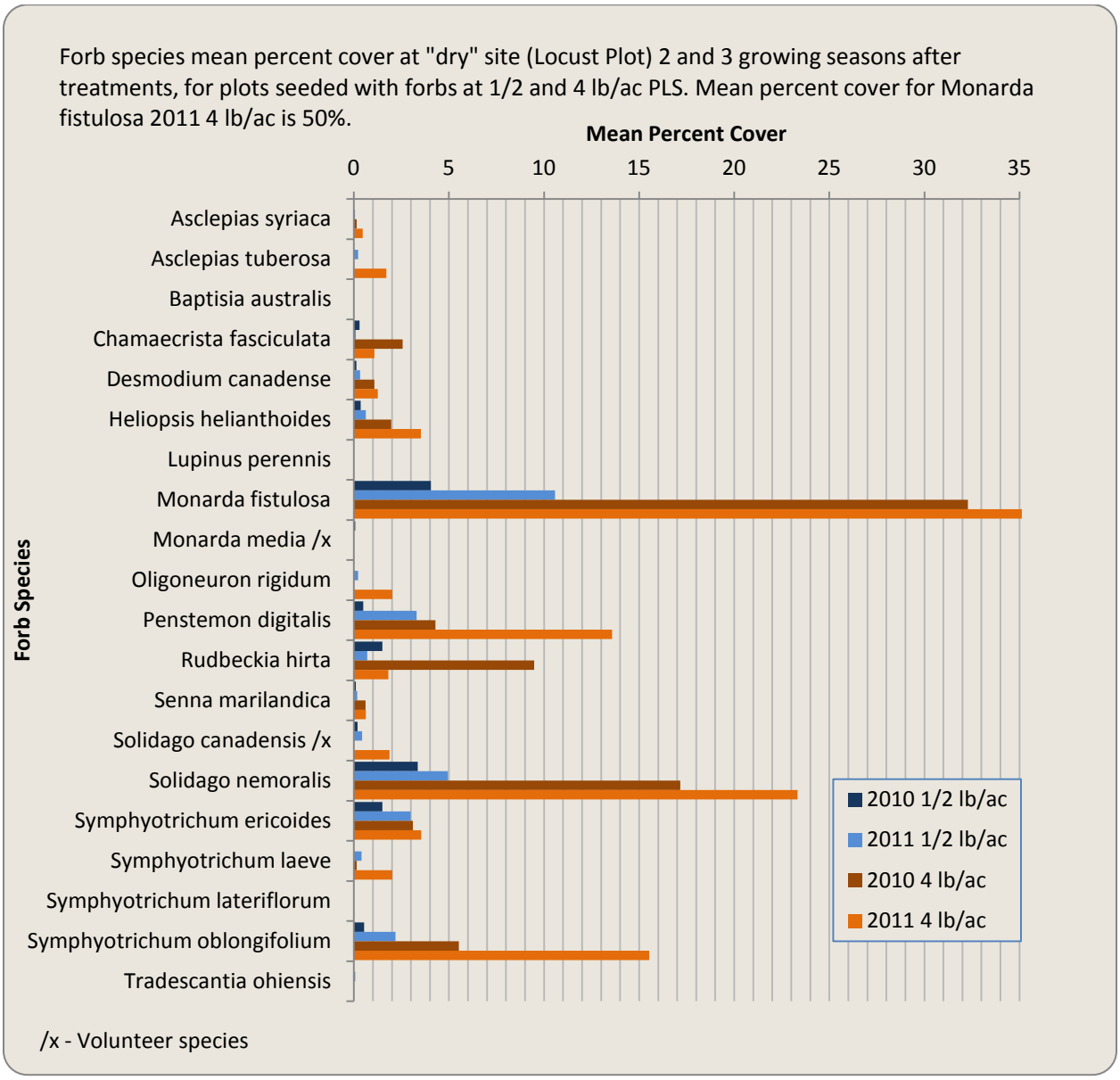
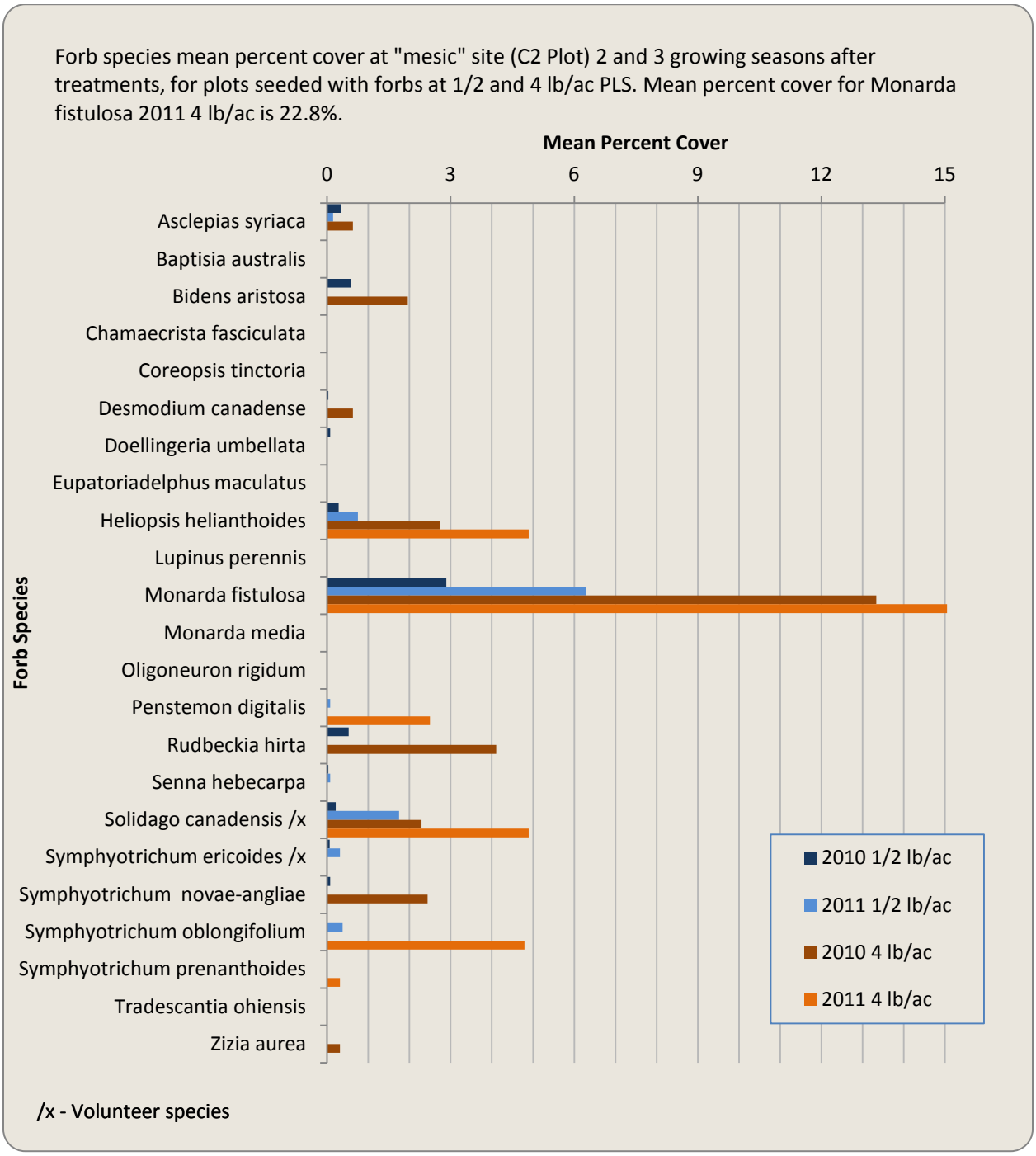


Figure 14: Forb species mean percent cover at the "mesic" site, 2 and 3 growing seasons after treatment.



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http://Plant-Materials.nrcs.usda.gov
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