



Establishing Native Forbs in Existing CRP Using No-Till Techniques in Northern Idaho: Comparison of Drills and Seedbed Preparations

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Introduction

Habitat for pollinators, upland birds and other wildlife can be improved by diversification of existing Conservation Reserve Program (CRP) fields. Additional conservation benefits can be realized if diverse plant species are established without tillage, particularly on the steep slopes in the Palouse region of northern Idaho. A study was conducted to determine if native forbs can be established with no-till techniques, and if there are differences in drill type and seedbed preparation methods.

Materials and Methods

The study was conducted on three glyphosate-treated CRP field sites in Latah County, Idaho, including one 20-year-old stand of intermediate wheatgrass [*Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey] (Site 2) and two 7-year-old stands of native bunch grasses dominated by bluebunch wheatgrass [*Pseudoroegneria spicata* (Pursh) Å. Löve] and Idaho fescue (*Festuca idahoensis* Elmer) (Sites 1 and 3). Sixteen species of native Palouse Prairie forbs were seeded at the three sites in October 2010 with two no-till drills (a Cross Slot® and a Great Plains® double disk) and two seedbed preparations (mowed and not mowed) in a split-plot design.

All plots were treated in Year 1 with a grass-selective herbicide to kill regrowing perennial grass and grass weeds. Mowing was also used as a weed control method at Sites 1 and 3. The plots continue to be monitored and treated with herbicide when necessary.



Seeding plots with a no-till double disk drill in October 2010 at the Jensen Farm in Latah, County, ID.

Results

1) Forbs established more rapidly in the 20-year-old intermediate wheatgrass stand (Site 2) than in the 7-year-old native grass stands (Sites 1 and 3). Site 2 had lower weed pressure than the two other sites.



Evaluating first-year forb establishment in the intermediate wheatgrass stand (Site 2) on May 5, 2011.



Mature forbs at Site 2 (previously a 20-year-old stand of intermediate wheatgrass) four years after planting, July 1, 2014.

Results Continued

2) There was a significant ($P < 0.05$) drill effect in Year 3 at Site 1 and in Years 2 and 3 at Site 3. The drill type results varied among sites.

3) There was a significant ($P < 0.05$) mow effect in Year 2 at Site 2, however in Year 3 the difference was no longer significant. There was no significant mow effect at any of the other sites.

Drill Effect

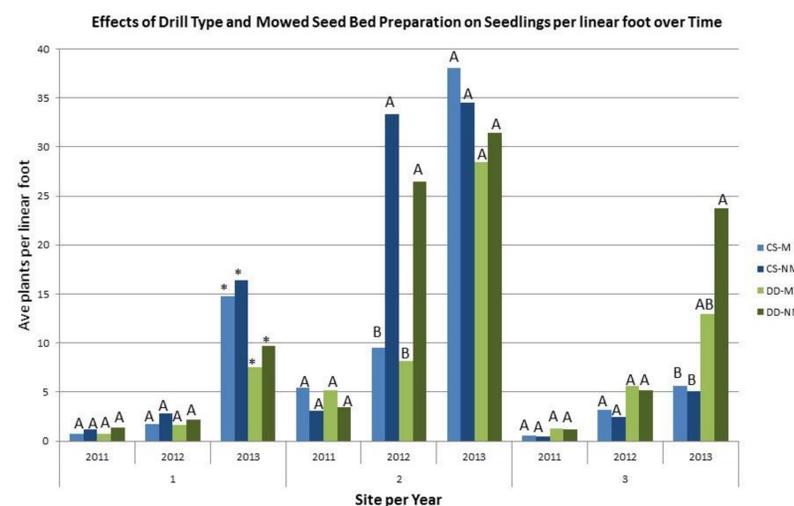
Treatment	Site 1			Site 2			Site 3		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
	Plants per linear foot								
Cross Slot	0.94 A *	2.23 A	15.59 A	4.58 A	21.41 A	36.27 A	0.53 A	2.82 B	5.36 B
Double Disk	1.06 A	1.91 A	8.60 B	4.28 A	17.32 A	29.94 A	1.27 A	5.39 A	18.37 A

Mowing Effect

Treatment	Site 1			Site 2			Site 3		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
	Plants per linear foot								
Mow	0.73 A	1.65 A	11.15 A	5.30 A	8.85 B	33.26 A	0.95 A	4.40 A	9.27 A
No Mow	1.27 A	2.49 A	13.04 A	3.56 A	29.88 A	32.95 A	0.84 A	3.82 A	14.44 A

* Means within the same column followed by the same letter are not significantly different according to Tukey HSD at $P < 0.05$.

4) Forb density increased in all plots from Year 1 to Year 3, and all exceeded CRP certification requirements (3 to 5 plants per square foot) by Year 3. Approximately 85% of the plants at Site 1 were the annual and short-lived perennial species, 78% at Site 2 and 62% at Site 3. Site 2 continued to have the highest density of forbs throughout the first three years of the study.



Means with the same letter above the bar within the same year and site are not significantly different according to Tukey HSD at $P < 0.05$. * = Data could not be statistically analyzed due to pattern of significant differences. CS = Cross Slot; DD = Double Disk; M = Mowed; NM = Not Mowed.

Results Continued

5) By Year 3, 14 of the 16 species seeded were present at Site 1, all 16 species were present at Site 2, and 15 of the 16 species were present at Site 3.

The species with the most successful establishment were:

Grand collomia (*Collomia grandiflora*) (an annual) and Oregon sunshine (*Eriopyllum lanatum*) (a short-lived perennial)

The perennial species with the most successful establishment were:

Western yarrow (*Achillea millefolium*)
 Nineleaf biscuitroot (*Lomatium triternatum*)
 Oneflower helianthella (*Helianthella uniflora*)
 Lupines (*Lupinus* spp.)
 Arrowleaf balsamroot (*Balsamorhiza sagittata*)
 Blanketflower (*Gaillardia aristata*)



Monitoring Year 3 plant density at Site 3, June 27, 2013. Distinct differences were observed between drill type at this site – plots seeded with the double disk drill had significantly higher plant density than plots seeded with the cross-slot drill.

Study Conclusions

The results suggest no-till techniques may be used to establish native forbs. There were no consistent differences among drill types used, and no overall effect of mowing as a seed bed preparation method. Seedlings established more rapidly at the site with a previous 20-year-old stand of intermediate wheatgrass than at the two 7-year-old stands of native bunch grasses. All sites met CRP certification requirements by Year 3 of the study. Several years of establishment may be required before determining stand success.

Long-Term Monitoring and Research

All study sites are being monitored and treated with appropriate herbicides for weed control. Troublesome weeds include ventenata [*Ventenata dubia* (Leers) Coss.] and prickly lettuce (*Lactuca serriola* L.). In Year 4, there was an observed increase in vole (*Microtus* sp.) predation. Species such as lupine, yarrow, and blanketflower are establishing outside of the planted area.

A large-scale, follow-up study has been planted to determine if the most cost-effective and available species will result in similar success. Minimizing seed cost is a priority.

Contact Information

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