United States Department of Agriculture

NRCS Natural Resources Conservation Service

2012
Pullman Plant Materials Center
Progress Report of Activities

Issued Feb, 2013

PO Box 646211 , Pullman, WA 99164-6211 **Website: http://Plant-Materials.nrcs.usda.gov/wapmc**

Pullman Plant Materials Center

Our Mission:

Develop Revegetation Plants and Revegetation Technology for the Inland Pacific Northwest.

Who We Are

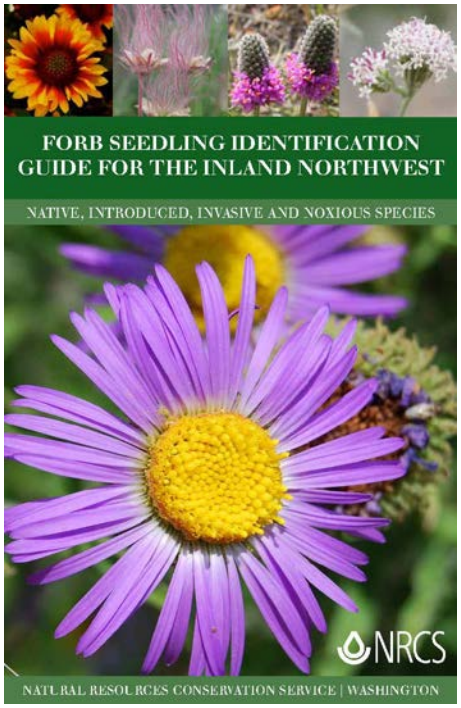
The Pullman Plant Material Center (PMC) is one of 27 Plant Materials Centers (PMC) that are scattered across the Nation and are charged with developing cost effective vegetative solutions for land stewardship problems.

The Pullman PMC lies in the Palouse Hills and serves northern Idaho, and Washington & Oregon east of the Cascades.

This report highlights the major activities at the PMC during 2012. For more detailed information, contact the PMC or the Plant Materials Specialist in Spokane.

New PMC Publication:

The Forb Seedling Identification Guide for the Inland Northwest



The Forb Seedling Identification Guide for the Inland Northwest was published and is being distributed to Field Offices and agency partners within our service area. The guide contains descriptions of over 140 broadleaf plants, and photos of their seedling and mature life forms. It also provides information regarding the plant's native or invasive status, priority for control, and look-alike species. The intent of the guide is to facilitate the evaluation of new conservation plantings with a forb component. The guide also serves as a condensed reference to the most common broadleaf weeds and native plants in our region.

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Screening of Legumes for Cover Crops in Orchards and Vineyards

Orchardists in Washington are interested in finding a legume cover crop to supply nitrogen and diversify their drive rows. They have questions about whether the advantages associated with growing a legume cover crop outweigh the potential disadvantages, and which species will be suitable. The cover crop must not attract an unsustainable number of insect pests and rodents, deprive trees of nutrients and water, or release nutrients at an inappropriate time. It must be able to tolerate traffic, grow quickly under shade, maintain an appropriate orchard floor temperature and survive 3 to 5 years.

Working with the Prosser Field Office, we planted 22 cover crop plots in three different orchards in Benton County, WA, in September 2012. The three orchards were a new conventional apple orchard, a mature organic apple orchard and a new organic almond orchard. The 22 plots consisted of perennials, annuals, individual species, mixtures, and various cultivars. After two years of evaluating percent cover, biomass, % N, and other factors, we will include the top rated species in advanced trials to assess their interaction with fruit trees.

Woolypod vetch cover crop in a new apple orchard in Benton County, WA, 8 weeks after planting. Photo: Lisa Kucek

Soil Health Study

"*… we've never lost sight of our roots. In the coming weeks and months, we're getting back to our roots, focusing more even more attention on soil health and educating our customers and the public about the positive impact Soil Health Management Systems can have on productivity and conservation*.",

Dave White, former NRCS Chief, April 24, 2012.

The Pullman Plant Materials Center and 5 other PMCs across the nation are participating in a national soil health study. The goal of the study is to evaluate cover crop mixes in rotation with a commodity crop and the effects it will have on soil properties that determine soil health.

Each participating PMC is charged with seeding 3 cover crop mixes at 3 different rates in the fall. A commodity crop will be seeded in rotation with the cover crops. This cover crop-commodity crop rotation will run for 3 full cycles. Soil temperature, bulk density, soil resistance, biological activity, soil chemistry, percent cover, and commodity crop yield data will be collected over the course of study. Regional Plant Materials Specialists and USDA ARS researchers have been instrumental in designing this study, and they are overseeing the implementation of the study at the 6 PMCs.

The cover crop plots were conventionally seeded in October 2012. The cover will be sprayed and "crimped" down this spring to improve decomposition of the foliage. Our commodity crop, barley, will be direct seeded soon afterwards using a Truax no-till drill. All subsequent seedings (cover crops and commodity) crops will be direct seeded as well.

Mark and Dallas planting the Soil Health Study. Oct 3, 2012. Photo: Pamela Pavek

Low-Maintenance Irrigation for Windbreaks

Rocky Mt. Juniper is an outstanding shrub for use in windbreaks and living snow fences. Its dense foliage provides wind protection throughout the entire year, and they are far less prone to spread than western juniper. Rocky Mt. Juniper is quite drought tolerant and has performed well in areas that receive as little as 7-inches of annual precipitation.

As expected, weed barrier and supplemental watering improves seedling survival and growth. Watering seedlings in remote sites is not always practical. Drip irrigation systems are costly and require energy to run a pump. Watering out of a tank in the back of a pickup is a slow tedious job.

Richard Fleenor, PMS, and Tim Dring, State Biologist, conducted this trial was to see if supplemental water, from a 5-gallon bucket, for one growing season would improve survival and growth of Rocky Mt. Juniper seedlings planted in a windbreak in an non-irrigated, arid (6-9 inch precipitation) environment.

Two windbreak-like rows were planted with Rocky Mt. Juniper seedlings in April of 2012 at the WSU Prosser Experiment Station. One row was planted into fabric mulch, only, and the other row was planted into fabric mulch with each seedling getting a 5-gallon bucket. Buckets were placed about 2 inches deep into the ground next to the seedlings. Each bucket had a hole drilled into a bottom corner with a short piece of cotton rope pushed through it. Seedlings were planted on the north side of the bucket and buckets were situated so that the cotton rope was on the north side as well. The bucket was filled one time with water and a brick was placed in the bucket to weigh it down.

First Growing Season Observations

1. Up until very late in the growing season it appeared that all seedlings, i.e. both fabric only and fabric and bucket treatments, survived and were doing well. In late November, however, it looked like a couple of the non-bucket seedlings may have died. We'll know for sure when we follow-up in spring.
2. Surprisingly, the buckets had water in them most all summer long. The ropes may not have been wicking water from the bucket to the soil as expected. In late summer two of the buckets had finally run dry.
3. About half the buckets had juniper roots growing in them. When the buckets were removed in mid fall these roots were severed from the juniper seedlings. We expect this to negatively affect seedling growth during the second growing season.
4. A sodium like substance was found in the buckets. We weren't sure whether the source for this was from the water added or from the brick.

Second and Third Growing Seasons:

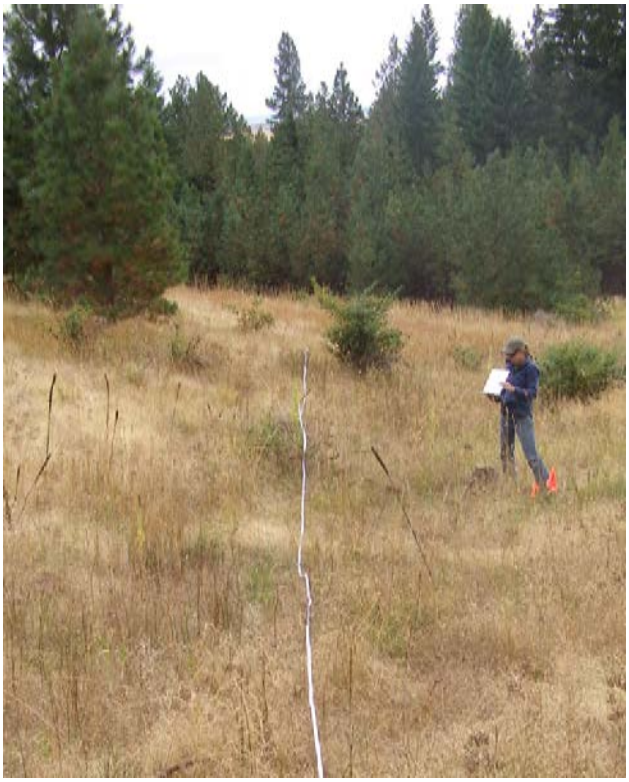
Seedling survival and growth will be monitored during the 2013, and 2014 if necessary, growing seasons.

Rocky Mt. Juniper roots growing in the bottom of the 5-gallon bucket.

Ventenata Research

The invasive winter annual grass, ventenata (*Ventenata dubia*) has become problematic in range, pasture, and CRP fields in our region. We continue to collaborate with the University of Idaho to assess seed longevity in the soil seed bank and the effect of litter on germination. This year we added three new ventenata studies.

The first study involves comparison of herbicide treatments in eight CRP fields in Spokane, County, WA. Four of the fields have adequate density of desirable perennial vegetation and were sprayed with herbicide in the fall of 2011 or 2012. Four other fields do not have adequate density of desirable vegetation; these fields will be chem-fallowed for 2 years and re-seeded in spring 2013. We are collecting percent cover and stem count data from treated and control plots to determine changes, and we are providing this information to Field Offices so they can help landowners make informed management decisions.



Pamela preparing to monitor a transect in Spokane County, WA. Photo: John Spring

The second study is a field-based replacement series design with four grass species and one legume specie planted at two densities and five ratios with ventenata to assess the interference effects ventenata has on the target species.

Taylor, Mark, Archie, Dallas, and Richard planting the ventenata replacement series study at the PMC, May 2012. Photo: Pamela Pavek

Establishment of Pollinator Habitat

This year we collected data on forb establishment plots throughout our region, and are using that data to fine-tune our pollinator habitat establishment guidelines. We are learning the most successful plots are those with the least amount of disturbance prior to planting. We are also discovering which species establish reliably in each precipitation zone. At the PMC, we expanded our 2 acre Pollinator Habitat Demonstration Garden to include more native forbs. The forbs will be used to help educate visitors to the PMC about native wildflower species and be used as a source of seed for other projects.

Pollinator species direct seeding trial, Jensen Farms, Moscow, ID. Photo: Pamela Pavek

Assessment of Washington CRP

The Conservation Reserve program has been one of the most successful cropland retirement programs in the world. Over 1.4 million acres of cropland was retired in Washington alone. The first contracts were installed over 25 years ago and much has been learned over this span of time. It is, in essence, a 1.4 million acre laboratory.

Native forbs and shrubs colonizing Douglas County CRP. Photo: Richard Fleenor

Most of Washington's CRP acreage occurs in the center portion of the state. This region lies in the rain shadow of the Cascade Mountain Range. As little as 7-inches of precipitation falls here and makes it one of the most arid nonirrigated wheat producing regions in the world. Winter wheat production techniques proved detrimental to establishing perennial CRP vegetation but Washington producers became quite adept at establishing CRP.

The latest wave of CRP required assessments of existing CRP ground. If the vegetative cover was adequate and met the species requirements, a producer could "re-up" his/her contract for an additional 10 years. Years of experience showed a need to train NRCS field staff on proper assessment techniques and the need for "many boots on the ground". Four CRP assessment trainings occurred in 2012 to ensure that NRCS and Conservation District field staffs were well versed and consistent in assessing vegetative cover.

Pamela Pavek (Pullman PMC Agronomist), Mark Stannard (Pullman PMC Mgr), and Richard Fleenor (WA NRCS PMS) set aside their normal activities, put their boots on the ground, and spent much of the summer assessing CRP stands on over 600 fields in several counties. Assessing stands that ranged in maturity from one year to 27 years old provided an exceptional opportunity to observe plant community dynamics. For example, crested wheatgrass is largely "ephemeral" in Washington CRP. Native species such as yarrow, lupine, rubber rabbitbrush, hawksbeard, and sandberg bluegrass crept in and replaced old crested wheatgrass plants. Fields that were less than 7 years old were largely comprised of pure stands of crested wheatgrass and the soil between the plants was bare. Conversely, older plantings had cryptogamic crusts between the plants. The presence of cryptogamic crusts appears to be akin to the "canary in the mineshaft".

Noxious weeds such as rush skeletonweed were most troublesome on old CRP plantings that were comprised of a single grass. Conversely, old CRP fields that were seeded to grass and later included plants of big sage and/or rubber rabbitbrush had less rush skeltonweed. These shrubs have deep root systems and compete well with skeletonweed.

CRP species mix that is protecting the soil 27 years post seeding. Photo: Mark Stannard

Among the lessons learned from the assessments was –

Crested wheatgrass will not persist for long periods of time in CRP under the climatic conditions of central Washington. It is a valuable place-holder but it will need replacement when long-term vegetative cover is required.

Publications

Common Wooly Sunflower Fact Sheet
Pea Plant Guide & Fact Sheet
Missouri Goldenrod Fact Sheet
Canada Goldenrod Fact Sheet
Taperleaf Penstemon Plant Guide & Fact Sheet
The Sweep Net January 2012
The Sweep Net August 2012
Forb Seedling ID Guide for the Inland Northwest
Biomass Crop Assistance Program - Camelina Guide
CRP Take-out Guidelines
2011 Annual Technical Report
2011 Progress Report
CRP 43 Seeding Guidelines