USDA NRCS United States Department of Agriculture
Natural Resources Conservation Service

# Pullman Plant Materials Center
# Progress Report of Activities

Issued Feb, 2007

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## Who We Are

The NRCS Plant Materials Program develops cost effective vegetative solutions for soil and water conservation problems. The Program consists of 27 Plant Materials Centers (PMC), which receive financial and/or technical assistance from the NRCS. The Pullman Plant Material Center lies in the heart of the Palouse Hills region of Eastern Washington; an area that is internationally recognized for its outstanding wheat yields.

## Stewardship Challenges of Washington & Oregon East of the Cascades

Basalt flows, Ice-age floods, glacial advances, and volcanic ash created the landscape and soils of Washington and Oregon east of the Cascade Mountains. Dryland winter wheat farming and irrigated farming in the Columbia Basin are large and important enterprises. Unfortunately, several hundred thousand acres of cropland go into the winter with insufficient cover to protect the soil. Winter winds strip unprotected topsoil and create dust clouds that degrade air quality for people living downwind. Melting snow erodes unprotected soil that pollutes receiving waters.

Many of the region's streams are important for salmon and steelhead trout spawning and rearing. Our riparian areas frequently lack desirable vegetation that provides shade and woody debris for fish habitat. Streambank revegetation with desirable plants is hindered by invasive plants.

Annual weeds have replaced native rangeland vegetation in many areas, and noxious weeds such as spotted knapweed are invading our forested areas. These undesirable plants greatly impede natural revegetation and threaten wildlife that depends on a healthy environment.

We have featured a few of our many studies in the *Progress Report of Activities* , and we hope they give a glimpse of our efforts at the Pullman PMC and the Washington State Plant Materials Specialist.

Plot seeding the old fashioned way. Russian wildrye trial on the Wes Durheim farm.

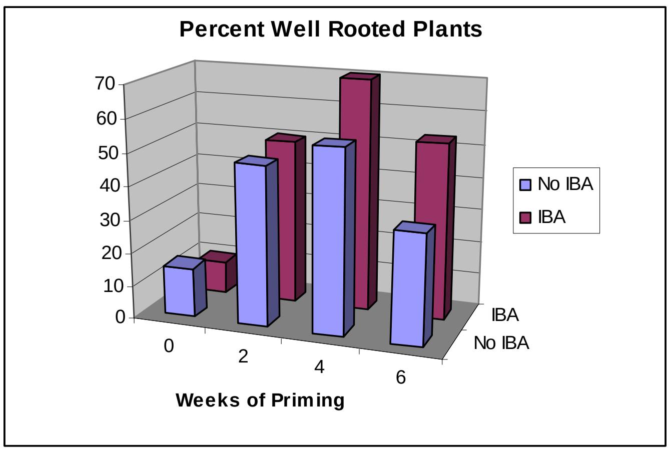
## Redosier Dogwood Priming of Cuttings For Better Establishment

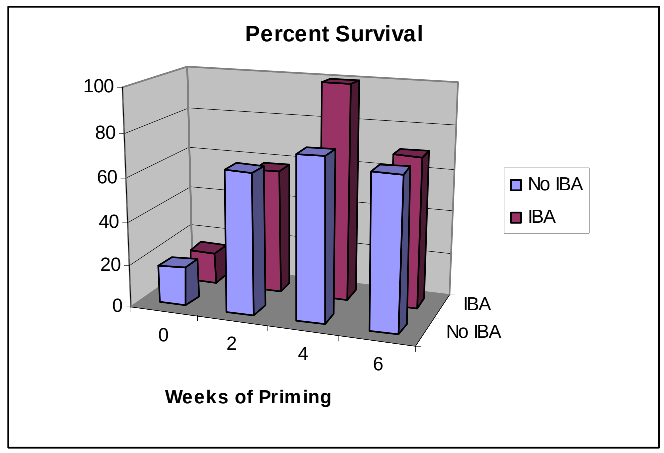
Redosier dogwood cuttings taken from eastern Washington sources root poorly in comparison to willow cuttings. Dogwood cuttings in greenhouse conditions tend to produce leaves much before roots develop which results in poor survival. Furthermore, rooting outdoors is around 50 days as opposed to around 10 days required for willows. While redosier dogwood cuttings are far more practical to plant, rooting must be improved before we can recommend this practice.

Priming is a process where plants or seed are moistened and held at temperatures too cool to allow for root development or germination, respectively. This process can dramatically speed up rooting/germination once the cuttings/seed are transferred to the field.

Redosier dogwood cuttings from an eastern Washington source were held in moist conditions in a refrigerator for 0, 2, 4 and 6 weeks then planted in the greenhouse, with and without IBA hormone treatment. Percent survival and percent of cuttings with well-developed, tight root systems were tabulated several weeks later.

The results indicate that 4 weeks of priming improves rooting of eastern Washington redosier dogwood. IBA hormone treatment without priming (week zero) has been a standard protocol for rooting dogwood cuttings but this study indicates that this protocol has little benefit. Six weeks of priming proved to be too unnecessary. Evaluation of priming under field conditions is the subject of a subsequent study.




## Stand Dynamics of 13 Conservation Plants 1977-2006

Long term persistence of plants is vital for many conservation practices such as critical areas seedings, range seedings, and CRP plantings. The Pullman PMC seeded a grass and legume study at the Lind Dryland Experiment Station in 1977 that used 13 species. Each was seeded either alone or with another species. The average annual rainfall is approximately 9-inches which is the lower end of adaptation of many of the species included in the planting. Twenty nine years later, the study was evaluated with NRCS field and area office staff assisting.

Few of the summer-active species were still present 29 years after seeding. This was expected because the area lies within a winter precipitation climatic zone. Early-spring native grasses performed very well with 'Sherman' big bluegrass being the most prevalent species. It had colonized every single plot and was by far the most abundant species in the planting. Sandberg bluegrass, an early-spring native grass, was not seeded in the planting but had come in on its own. Two introduced early-spring grasses, 'Nordan' crested wheatgrass and 'P-27' Siberian wheatgrass, were diminished to small tufts of the original crowns. The data from this year and past years indicate that 'P-27' Siberian wheatgrass and 'Nordan' crested wheatgrass behave like early-seral species in a low disturbance regime. The late-seral native grasses such as 'Secar' Snake River wheatgrass and 'Whitmar' beardless wheatgrass did not replace the early-seral grasses. These two late-seral species are very long-lived and seedling recruitment is a less important evolutionary characteristic.

# Straw Liquors for Fugitive Dust Reduction

Billowing clouds of dust kicked up by vehicles traveling down dirt and gravel roads are not only highly visible, they are also a source of dust particulates (PM10), and can aggravate wind erosion conditions. The airborne road particles can start the saltation process and result in tremendous soil losses downwind. Some producers will gravel their field travel lanes but the cost can be tremendously high and ineffective if vehicles travel at speeds greater then 20 MPH. Gravel roads are commonly treated with “road oil” to keep dust down but road oil, like all petroleum products, has become quite expensive. Scientists at Washington State University and the University of Washington recently developed an economical means to produce paper from grass straw, wheat straw, and alfalfa stems. One of the by-products of this process is “straw liquor”, a vile smelling slurry that remains after the pulping operation and has an interesting property of binding soil particles.

The Pullman Plant Materials Center in cooperation with WSU and UW established a trial at the Prosser Irrigated Agriculture Experiment Station. Three straw liqueurs, PAM, and Magnesium chloride were applied to the Rosa Unit main access road on July 20$^{th}$. Each plot was 50 feet long and replicated 4 times. Dust reduction was documented a few weeks later and again a few months later. An orchard fan was used as a wind source and dust was documented via video. The overall consensus of the investigators was: 1) PAM was not effective, 2) straw liqueur was not as effective as magnesium chloride, 3) mixing liqueur and magnesium chloride seemed to improve dust suppression initially but the effects were not long lasting.


Eric Harwood, PMC agronomist, and Bill Pan, WSU Soil Scientist, applying wheat straw liqueur plus magnesium chloride to the Prosser Experiment Station Roza unit main access road.
The “wet look” to the road lasted for several weeks after application because the magnesium chloride, being a salt, has a very strong affinity for moisture.

## HHH Tall Grass Trials

Tall grasses such as tall wheatgrass and basin wildrye are great herbaceous wind barrier plants. Wind barriers are not widely used in Washington but they have some features that warrant consideration. Tall grasses are compatible with most herbicides used in small grain production, do not take a lot of ground out of production, do not gather tumble weed carcasses, and protect field edges where tillage is intensive due to overlapping and turning. The Pullman PMC initiated studies to determine which tall grass was best suited for an extremely arid wheat growing area, and how to establish tall grasses in this environment.

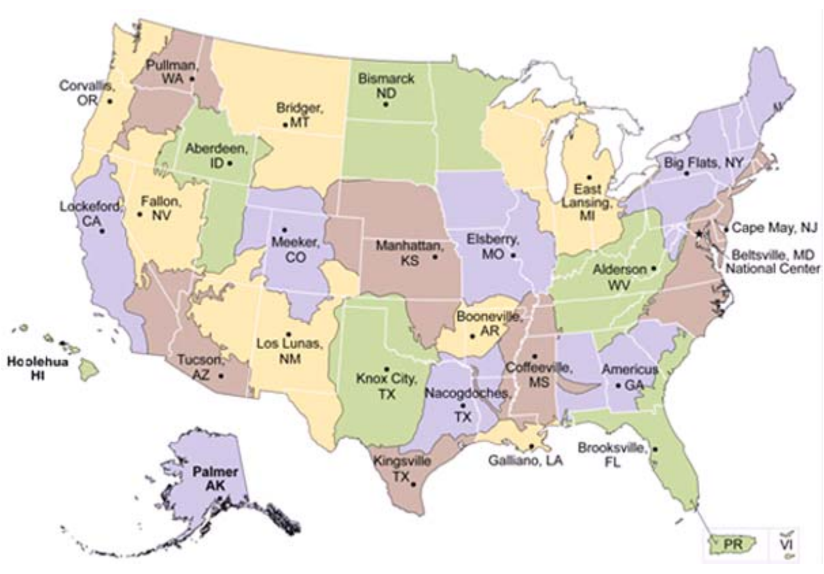
Space planted herbaceous wind barrier trial. Includes 4 species: tall wheatgrass, Russian wildrye, mammoth wildrye, and basin wildrye

The best performing herbaceous wind barrier was ‘Alkar’ tall wheatgrass in a trial planted in the Horse Heaven Hills. It attained an average height of 4 feet and each plant had in excess of 27 stems. ‘Magnar’ basin wildrye was taller than tall wheatgrass but its stem density was only 8 stems per plant. ‘Alkar’ tall wheatgrass was more competitive with cheatgrass and its basal diameters were greater than ‘Magnar’ basin wildrye.

Establishing ‘Alkar’ tall wheatgrass from seed in the Horse Heaven Hills is not practical. Transplanting rooted ‘Alkar’ plants is our best option. A study is underway to determine which time of year is most practical transplanting tall wheatgrass herbaceous wind barriers in the Horse Heaven Hills.

## For More Information

To learn more about these and other PMC activities, visit: **http://Plant-materials.nrcs.usda.gov.**
**or**
**http://www.wsu.edu/pmc_nrcs/**




Locations of 27 USDA NRCS Plant Materials Centers and their respective service areas.