PLANT MATERIALS TODAY

A newsletter from the USDA-NRCS Montana-Wyoming Plant Materials Program for those Interested in Plants and Conservation

Volume 20 Number 4 January 2015

For more information on Plant Materials or for electronic access to this and other documents, access our web sites, Montana NRCS at http://www.mt.nrcs.usda.gov or National Plant Materials Program http://plant-materials.nrcs.usda.gov/mtpmc/. Direct inquiries to USDA-NRCS, Plant Materials Center, 98 South River Road, Bridger, MT 59014, phone: 406-662-3579, FAX: 855-510-7028. All photos by BPMC staff unless otherwise noted.

Important Reminders

*Field Offices – Don't forget this is the perfect time of year to collect dormant wild grape cuttings. The cuttings should be about 1 foot long, about as thick as a pencil, and have at least 3 nodes. Ship them to the BPMC as soon as you can after collection to avoid drying them out. And despite what the bulletin says, there's still time to get field planting plans to your Plant Materials Committee representative for review at the plant materials committee meeting (March 4, 2015).

The Bridger Plant Materials Center (BPMC) Field Day has been scheduled for Thursday, June 11, 2015. A variety of demonstrations, tours, and

Tour at the Bridger Plant Materials Center

activities will be provided over the course of the day covering topics such as cover crops and soil health, pollinators, tree and shrub establishment, salt-affected soils, plant propagation, seed increase and processing, and more.

Feature Topic

Cover Crops and Soil Health

Mono-culture seed crop rotations and conventional tillage have caused Bridger Plant Materials Center soils to become low in organic matter, mycorrhizal activity, and available nutrients. Research has shown the addition of 30 pounds of nitrogen fertilizer aids in the establishment of cover crop rotations under these types of conditions. The benefits of supplemental nitrogen may also apply when producers are just starting to utilize cover crop rotations. The growth and development of cover crop species, such as radishes, are reduced by poor soil fertility. A starter fertilizer application results in deeper penetrating, thicker radish roots and increased above-ground biomass production.

In some cases, equipment use and selection can reduce the negative impacts of tillage. For instance, to help reduce the amount of tillage required for furrow irrigation, the BPMC purchased a winged ditcher. The "wings" on the ditcher are designed to move surface litter away

from the center of the furrow, enabling smoother irrigation water flow without requiring cultivation.

A winged ditcher

The Bridger Plant Materials Center has now completed 3 years of cover crop studies. The research has provided some very interesting results from both the cool and warm season species trials. Several tested species are rarely grown in Montana and Wyoming, including mung beans, cowpeas, fenugreek, and collards. What I am finding in our trials is that certain "exotic" cover crops do not perform well in mixes due to poor seedling vigor. In addition to performance issues, a seed source may be hard to find or if available, the seed can be expensive. Substituting a locally grown species of the same plant family can be an option for producers. A good example is soybeans as they are easy to find, but expensive, especially the glyphosate tolerant varieties. But glyphosate tolerant species are not recommended for cover crop use as this herbicide is used to "burn down" (terminate) the stand. With a local, dry bean elevator a mile down the road, I easily obtained and substituted kidney and pinto beans for soybeans in research mixes. They were cheaper economically, emerged very readily in all the warm season plots, produced good biomass before termination, and established excellent nodulation for nitrogen use by the following crop. The beans also did not show any negative effects from warm summer soil or air temperatures in contrast to a cool season pea's poor germination and stunted growth at that time of year.

A bean plant showing strong nodule formation

Another important cover crop consideration is the previously applied herbicides. Certain herbicides can have negative residual effects on broadleaf and grass cover crop species. By carefully reading herbicide labels, keeping detailed field pesticide application records, and planning cover crop rotations years in advance, herbicide carry-over can easily be avoided. We have learned a cool season cover crop may not be the best rotation if a substantial weed seed bank is in a production field. For example, in 2013 the BPMC cool season cover crop plots were planted in late April into dry soil conditions. Without irrigation water or spring rain, the seeds did not germinate until late May, the same time as a heavy stand of kochia, common mallow, pigweed, wild buckwheat, etc., which quickly overtook the plots. Even though some weeds can be valuable for supporting mycorrhizal populations, in this instance, they were not welcome. Implementing two to three growing

seasons of good weed control and less tillage prior to a cover crop would have been a better plan. This "weed" scenario would not have been as big of an issue for livestock producers as they could graze the available forage. After grazing was completed, producers could terminate the field and plant a warm season cover crop for additional hay, fall grazing, and improved soil health.

Cool season cover crops over-grown by weeds in 2013

Roger Hybner - BPMC Research Agronomist

Project Progress

DATR Chatter – The Development of Acid/Heavy Metal Tolerant Releases (DATR) Project

A species the DATR project would like to release to the commercial market for restoration of acid and heavy metal impacted sites is silverleaf phacelia, *Phacelia hastata*. A drought-tolerant and winter-hardy species, it is an excellent pollinator species, and would offer diversity and wildlife habitat enhancement in various critical area plantings.

Silverleaf phacelia

The DATR project and PMC are performance testing silverleaf phacelia. The length of cold stratification, and whether or not the seed has been scarified, are the two variables being tested in a greenhouse study in progress.

Another study, beginning this summer, will test how well silverleaf phacelia tolerates the low pH and heavy metal contaminated soils found at the Anaconda Superfund site. A greenhouse study will be conducted which will allow control over the limiting factors that may affect silverleaf phacelia establishment and growth. In the greenhouse environmental factors such as temperature, moisture, insolation, wind, and any insect or disease infestations can be controlled. Amended and un-amended soils will be collected from two locations at the Anaconda Superfund site. Silverleaf phacelia will be seeded in containers of these two soils, as well as uncontaminated soil from the PMC fields.

Joe Lefebvre, Project Leader, DLVCD

Russian Olive Seed Burial Depth Study

A greenhouse seed burial depth study was initiated in 2013 with three goals in mind. First, to determine if seed burial depth influenced Russian olive seed germination and emergence. Second, would non-emerged, buried seeds remain viable? Third, are there differences in

emergence and longevity based on population origin, i.e., from windbreak versus riverine sources? Seeds were collected from eight collection sites on the Yellowstone River near Miles City and Sidney, Montana, in the fall of 2012. After an 83 day cold-stratification period, they were planted in the greenhouse in Yellowstone River sand at depths of 1, 3, and 5 inches. Results at the end of the 188 day

Russian olive seed emerging from a container

growing period were compelling. About 67% emerged from the 1 inch planting depth, but only 0.0025% and 0% emerged from the 3- and 5-inch depths, respectively. The one seed that emerged from the 3-inch depth is thought to be an anomaly caused by improper depth placement at seeding. In addition, no seeds from the 3- and 5- inch depths were viable at the end of the experiment. These seeds had either germinated and could not reach the soil surface or had been infected with bacterial or fungal agents and rotted. No differences were found between the windbreak and riverine sources. These results suggest that seeds initially buried at 3 or more inches may not be able to germinate, emerge, and maintain a seedling if subsequently uncovered by a flood. To get the full story, read Plant Materials Technical Note MT-107.

Roger Hybner, Research Agronomist

Seasonal Suggestion

Wind and Snow Deposition

A Plant Materials colleague regularly penned a newsletter column we really enjoyed titled, *Outside My Window*. In it, he extrapolated from many interesting and timely observations made looking out his office window to relevant conservation ideas and considerations. So looking out of my window at a ground blizzard and moving snow this winter made me think of plants and snow deposition.

Snow deposition by basin wildrye plants

The effects of plants on the deposition of snow are remarkable, and although we often think of trees and shrubs in living snow fences in this regard, almost any vertical plant part will influence where snow is deposited. Plants producing tall, erect, stout foliage, such as basin wildrye, switchgrass, Maximilian and sunflower, are particularly effective at trapping snow. Physical structures such as snowfence, buildings, and even telephone poles can cause localized

deposition of snow.

Snow deposition in a grass demonstration planting

Remember the effects of plants on snow deposition when designing and developing vegetative conservation plantings. Another possible implication of snow deposition may be the exacerbation of salinity on salt-affected sites as additional soil moisture may move dissolved salts upwards in the soil profile and into the rooting zone in seep areas.

Plants are useful tools in snow management and therefore soil moisture storage, but can also place snow in undesired places, such as driveways and lanes, so consider established distance and clearance guidelines when designing and planning conservation plantings.

Snow deposition from a fence and windbreak

Technician Tip

Designing a Better Mouse Trap for Cleaning Rocky Mountain Juniper Fruit and Seeds

Cleaning Rocky Mountain juniper fruit is such a challenge that we actually wrote a Technical Note on the subject many years ago. That Note basically describes the benefits of using citrus hand cleaner with pumis and inserting an abrasive screen inside the macerator in order to improve fruit cleaning and seed processing.

After cleaning Bridger-Select Rocky Mountain juniper this fall, we noticed how quickly warm water helped reduce the stickness on our hands after handling the macerated pulp. With this in mind, we decided to add warm water to the macerator during fruit processing to see what would happen. By simply adding warm water during maceration instead of cold, we significantly reduced cleaning time.

Fruit macerator used at the Bridger PMC.

The use of warm water decreased maceration time by more than 50%, and dramatically reduced the volume of water needed per batch, saving staff time and resources.

Darren Zentner, Ross Oyler, and Robert Fisher - BPMC Biological Technicians