Tech Talk

A Newsletter for the Plant Materials Program Biological Technicians

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PMC Biological Technician Workshop

It has been over six months since we met at the Farm Management and Agronomy Principles for PMC Biological Technicians Workshop in Aberdeen, ID. This was a great opportunity for information and technology exchange. Many thanks to the Aberdeen PMC staff who did a wonderful job hosting the workshop.

A suggestion was made to develop a biannual newsletter for technicians that would help keep the lines of communication open between centers. This is the inaugural issue of Tech Talk. I would like to thank all of you that submitted articles for this issue. Many of the articles have been edited for space considerations. The complete paper or article can be obtained by contacting the author. This issues has a wide range of technical information with many innovations that might be useful at your location. On page five you will find the question and answer section of the newsletter. If you have a possible solution or answer contact the person directly. Then we will print the answers and report the successes in our next issue scheduled for this October.

INSIDE THIS ISSUE:

This group was featured on the television show America's Most Wanted last Saturday Night. Something about disorderly conduct at the Best Western in Pocatello, ID.

Waterjet Stinger

Aberdeen, ID – Boyd Simonson and Brent Cornforth, Biological Technician
Excerpts taken from: Riparian/Wetland Project Information Series No. 17, January, 2001

Opportunities for riparian revegetation around the nation are numerous. Planting dormant unrooted cuttings often called pole plantings, post plantings, or live stakes is one technique that is often recommended for streambank stabilization and riparian buffer planting. Dormant unrooted cuttings are used because they are easy to harvest, easy to plant, inexpensive, and effective. In the arid and semi-arid West, it is extremely important that any plant that is installed in a riparian zone have its roots in the lowest watertable of the year. The biggest problem we faced was finding a method and developing equipment that could dig a hole

The Waterjet Stinger was specially designed to use high-pressure water to hydrodrill a hole in the ground to plant unrooted hardwood cuttings into riparian revegetation. This is not new technology, in fact, it has been around for a long time. Based on a request from Scott Henderson, an Idaho NRCS Field Office employee, and others, Boyd Simonson, PMC Biological Technician, used a design from Drake and Langel (1998) and attempted to modify their design to better fit the coarse soils in the Intermountain West.

He started with the actual probe itself. A local machinist used the detailed drawing to build the nozzle out of stainless steel and welded it to a ½ in steel pipe. Boyd added a T-handle at the top to help with the planting operation and a ball valve at the handle to turn the water on and off. It took quite a bit of research to come up with the right size pump. Next, Boyd felt that for safety's sake, a pressure relief valve should be installed so when both water jets were shut off, the water from the pump would bypass back into the stream or other water source.

Water is delivered through heavy-duty 5/8 in garden hoses with a pressure rating of 100 psi that are 100 ft long. The hoses run from the garden hose quick couple manifold to the waterjets. At the planting site, the hoses are laid out parallel to the stream channel. The two waterjets can be operated with two separate crews. One crewmember runs each waterjet and the other crew members transport the cuttings and push them into the holes after they are hydrodrilled.

The waterjet stinger is easy to operate and transport. Very little training is necessary to operate the waterjet stinger. The pump intake should be placed in a fairly sediment free location in the streambed to operate properly. Hydrodrilling a planting hole with the waterjet stinger is fast and relatively splash-free. A large number of cuttings can be planted in a short period of time with very little effort compared to conventional planting methods. Planting into a hole filled with water allows each cutting to be planted directly into a wet microenvironment.

Overall, the waterjet stinger is relatively inexpensive when compared to other planting methods. The PMC prototype waterjet stinger cost about $1000 for parts (see Appendix B) and labor to build it was about $500 for a total of about $1500. The design layout was planned to make the entire piece of equipment as simple as possible to build and operate. All of the parts can be ordered or purchased locally, except the pump. An experienced machinist can build the waterjet nozzle in a couple of hours with the plans provided in the tech note. The entire waterjet stinger can be assembled in less than a day.

For more information call Chris Hoag at 208-397-4133 or Boyd Simonson at 208-397-4501. For those people who have access to the Internet, email messages can be sent to choag@id.usda.gov.

Harvesting Small Seed Increase

Larry Sticka Jr., Farm Foreman Bridger PMC

The Bridger PMC is involved in the production of native indigenous plants for the restoration of roadsides in Yellowstone and Glacier National Park and acid/heavy metal tolerant plants for sites impacted by past mining and smelting activities. The seed increase fields are usually small, varying in size from 2 to 30, 300 ft rows (0.04 to 0.60 acres). Many of these species have indeterminate ripening, making it difficult to harvest all of the seed. Because it is critical to maximize our seed production, we had to come up with a means of reducing shatter loss during harvesting. What we came up with was to diaper our swather.

The first prototype utilized a standard 4 X 7 ft orange plastic irrigation dam. The edges were doubled and sewn with a seed sack sewing machine and grommets were spaced along the sides, four on each of the long sides. Six springs and snap hooks were attached on the under-side of the swather so that the diaper would be suspended below the opening between the two draper canvases. Once the 6 hooks were attached to the diaper, the leading edge of the diaper was attached to the underside of two sickle guards with smooth wire (the third one back from the windrow opening on each side). With the diaper in place, all cut material is accumulated.

The material is cut with a very high stubble, trying to get mostly seedheads, with very few stems and leaves. The material is pulled off of the diaper and put on sheets of plastic to dry. After 3-5 days of drying, the material is fed through our Wintersteiger plot combine. The ripening seed often shatters onto the plastic during drying. If the fields would have been swathed and combined out of the windrow, much of the seed would have been lost to shatter. A newer diaper was custom built by Omar the Tent Man (actual company name) using heavy white canvas. There was some problem with awned seed sticking to the canvas diaper, while static electricity often held seed to the plastic diaper. A diaper, whether made with canvas or plastic irrigation dams, will last about three seasons. We are harvesting approximately 30 small increase fields per year using our diapered swather.

Using PAM to Reduce Furrow Erosion

The 140 acres of the Bridger PMC is set up to be irrigated with gated pipe utilizing two buried feed lines. On the lower end of the farm there is enough pressure to run 3-4 sprinkler lines, but most of the fields are furrow-irrigated with 8" gated pipe with open drain ditches on each field that empty into buried drain lines. All fields are established using 36 inch row spacing. This wide row spacing is used to facilitate the rouging necessary for the production of Foundation quality seed. The Bridger PMC is not flat. Although we have had extensive land leveling, the fields have slopes varying from 1% to 3½%. With a wide row spacing most of our fields require a 24 hour set to soak across the 3 foot row spacing. The combined effect of wide row spacing, sloping fields, and long sets made for some major silt loads going off the fields with the waste water and often deep furrows were cut, particularly at the upper end of each row.

After reading about the use of PAM (polyacrylamides) by ARS researchers in southern Idaho, we decided to give it a try at the Bridger PMC. We purchased a hand held applicator that dispenses two tablespoons of granular PAM at a time. With a twist of the wrist another measure of PAM is dispensed from the bulk tank on the end of this PVC applicator tube. Before the water is turned on, 4 tablespoons of the granular PAM are dispensed at the head of each furrow. This application rate is usually adequate for most of our fields (250 to 300 foot rows). At this rate we are applying 6 lbs. per acre at a cost of $25.00 per acre. Once applied, PAM does not have to be re-applied for subsequent irrigations unless you have cultivated . Attempts to dribble granular PAM into the gated pipe was not successful. With the assistance of the NRCS state irrigation engineer, attempts were made to utilize a vibrating injector and mixing baffles in the first section of gated pipe. With the use of PAM on our steepest fields we have noticeably reduced the amount of furrow erosion and the silt loads in our waste water.

Excess Equipment at the East Texas PMC

The following is a list of surplus equipment, with a brief description, located at the East Texas PMC. For additional information contact Tim Allen at (936)-564-4873 or Tim.Allen@tx.usda.gov.

1. Johnson Big Wheel Mower 24", single blade cut, 8 H.P. Briggs & Stratton motor, self-propelled
2. Snapper Riding Mower 14 H.P. Briggs & Stratton motor, has collection bag
3. John Deere 18 Gallon Sprayer 3-point hitch, 5 H.P. Briggs & Stratton motor
4. John Deere Cultivator – 13'6" wide, 8 rows
5. Massey Ferguson 3 Bottom Plow
6. Vac-A-Way Seed Cleaner - 22" wide, 41" long, 40" tall, 2 screen cleaner with 6 screens
7. J. W. Hance Mfg. Co. Seed Cleaner 31" wide, 53" long, 59" tall, 2 screen cleaner

Earl Aune, Biological Technician Bismarck, ND

I live out in the country
Where them gentle winter breezes blow
Ya! About 50 miles per hour
And it gets down to 60 degrees below

Now you know your in the Northland
When the snows up to your butt.
And you take a breath of that fresh clean air
And both nose holes they freeze shut.

Why just the other day I heard my dog a barking
It was about as cold as it could be
And when I finally found my dog, there he stood upon three legs, quick frozen to a tree.

But usually, the weathers rather perfect
And I just have to stick around
You see I can't ever leave North Dakota
Cause me feet are frozen to the ground.

Ed Black and Robert Santucci, Technicians, Brooksville, FL

We would like to thank Idaho for the information on the cultivator. It has proven to be a good piece of equipment for us. It was what we were looking for.

James O. Pomerlee, Technician Coffeeville, MS

After 40 years, the PMC is finally getting an irrigation system. None of this would have been possible if I had not met the fine folks (Eddie and Dale) from the Booneville PMC at the training. I told them what we were planning and they offered us a Case TS 700 trencher. Since then, over 2,000 ft of 4" PVC line was installed under ground in September and another 3,500 ft. will be installed this spring. Irrigation water will be supplied from a 5 acre reservoir and delivered to evaluation plots and fields by furrow or over head sprinklers.

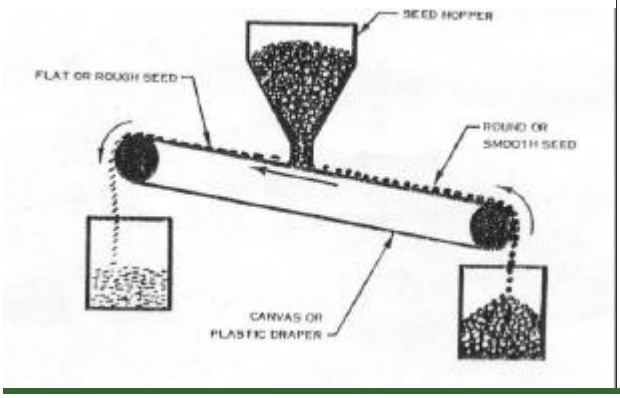
Question and Answer

Earl Aune, Biological Technician, Bismarck, ND

I am having problems removing green foxtail in switchgrass and quackgrass in crested wheatgrass. A few different ideas are being tried. I had an old cleaning mill in my barn, that I remember as a kid we used to clean wild oats out of oats. I'm including a picture so you get the idea how this machine works. Another idea is a gravity table. We don't have one so are making plans to demo one. The machine pictured shows the basic principle but the type of material on the draper adds some degree of catching certain seeds and carrying them up and over the top. We are trying a certain material sewed into a sleeve that can be slipped on the rollers. By doing it this way it can be removed and a different material can be tried.

The problems I see with this machine is to find the right material, plus to get the right speed on the draper which in the case of this old machine we will have to change to different size sprockets or come up with some variable speed mechanism. Any ideas or suggestions, please let me know.

Inclined draper separator



Mater Machine Works, Inc.,
520 Southwest First St, Corvallis, OR 97330

The inclined draper separates material that differs in capability to roll or slide. A mixture is metered onto the center of an inclined belt traveling uphill. Material that rolls or slides down the belt faster than the belt is moving up, drops into the lower hopper. Flat and rough material is carried to the top and dropped into the other hopper.

Mary Anne Gonter, Biological Technician, Brooksville, FL PMC

We are experiencing some difficulties with mold in our petri dishes when we are running germination tests. It would be nice to know if anyone has a remedy for this problem that would not affect the seed or its germination. When running most germination's, I use KNO3 and distilled water. If anyone has any suggestions please let me know.

Brent Cornforth, Biological Technician, Aberdeen, ID PMC

There has been some interest expressed by a few technicians in upgrading their planet juniors with double disc openers like Aberdeen. Planet junior used to make a small double disc opener that was available in lieu of planting shoes. They no longer offer that accessory and so we had some built by a local machinist. They were fairly expensive to build. The disc openers are six inches in diameter and require a separate mounting bracket that is different than those used for the shoes.

I visited with Ryan, our machinist and he said if there was enough interest in more of these we should explore designing and making a mold to reduce cost. There are a couple of cast companies in our area that we could possibly have pour them for us.

We would have to have enough interest and numbers to pursue this further. If any centers are interested, please contact me, by April 15, 2001 and we will see if this is worth pursuing.

Maggie Tank Hay Seeding Using Grass Hay Bales

Mark Pater and Harry Buck Tucson Plant Materials Center

The Maggie Tank Hay Seeding project is located on private land within the Sheep Canyon grazing allotment. The allotment is approximately 12 miles south of Bowie, Arizona in Cochise County. This project was designed to facilitate revegetation of deteriorated rangeland. Some natural revegetation had been occurring on the allotment over the past 10 years. However, there were areas that were not showing any significant response to improved grazing management. The idea was to use livestock as a tool to plant grass seed through trampling in the area where the hay material was distributed.

Native grass hay is very similar to straw and can be applied at the same rates as straw mulch. Native grass hay also contains seed of native species rather than cereal grains. Use of this form of material in revegetation efforts can aid in the establishment of a diverse native plant community. If the native grass hay bale material is spread by hand, livestock may be used to incorporate the material into the soil

Beginning in 1995, the Tucson PMC began baling and storing grass hay from its seed production fields. This practice was initiated due to an excessive accumulation of biomass in the PMC seed production fields. The arid climate in the southwestern U.S. is not conducive to rapid breakdown of organic material, the excessive organic matter in the PMC production fields hampered field cultivation and was beginning to depress plant growth and seed production.

In 1995, the Tucson PMC supplied approximately 50 bales of plains bristlegrass and yellow bluestem hay for the project. On March 8, 1995 half of the hay (both species) was thrown out in a trap along a pre-set line that had been previously sampled for grass plants. Approximately 90 head of cattle (including calves) were kept in the trap for several days. The cattle had never been fed hay, so instead of picking through it to eat, they used it for bedding.

The March 8, 1995 planting site was evaluated in October 1995 to determine if seeds did germinate and seedlings had become established. Transects were not run but 86 seedlings were counted along the line. Following a break in a severe drought, a transect for the March 8, 1995 planting was run in the fall of 1996. Significant differences in percent frequency of plains bristlegrass, yellow bluestem and burroweed were found. Plains bristlegrass showed a 42% frequency, burroweed a 20% frequency and yellow bluestem exhibited a 4% frequency.

The September 3, 1995 trial was evaluated on October 23, 1996. Significant differences in percent frequency were found in fluffgrass, yellow bluestem, plains bristlegrass, burroweed, snakeweed and mesquite. Observations revealed that the March 8, 1995 planting has significantly more grass than before but the plants appeared less healthy. This may be due to two factors. First, the hay may have been spread too thin which allowed the hay to break down faster and the seedlings did not have added protection and moisture. The second and obvious one is that they were greatly stressed during the drought period. It was surprising that any plants survived. The September 3, 1995 planting did not spread the hay out as thin as the first planting. At first this was thought to have been a mistake because no germination was observed. However, by the time the drought ended, the hay had decomposed enough that much better germination and survival was observed in comparison with the March 8, 1995 planting.