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Plants for the Heartland

A newsletter in support of the Plant Materials Program for Colorado, Kansas, Nebraska, and Oklahoma

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Spring Burning

INSIDE THIS ISSUE:

Emerald Ash Borer Study Shows Promise

In a previous edition of *Plants for the Heartland* (Vol.14, Issue 3) we discussed the emerald ash borer (*Agrilus planipennis* Fairmaire), its movement in the USA since being discovered in Michigan, and what some other states are doing to try and reduce its spread. In that report we indicated that scientists have been unable to find an effective control for the beetle or even a way to stop its movement. Despite statewide bans and quarantines on firewood, the insect has spread from southwest Michigan, where it was discovered in 2002, to several other states (Ohio, Indiana, Illinois, Maryland, and Pennsylvania).

A report from *The Flint Journal* highlights the news that a Michigan State University (MSU) study that began in 2007 has some promising tentative results. The study that only began last year includes a new chemical pesticide that appears to be almost 100 percent effective against the ash borer. The project's staff members have also discovered a wasp that parasitizes the ash borer's larval stage. Deborah McCullough, lead MSU investigator on the project, said her team is trying not to get too excited based on a single year's data. In the spring of 2007, McCullough asked for permission to bring her team into Wolverine Campground, For-Mar Nature Preserve and Arboretum, and Genesee Recreation Area to initiate a new study in the emerald ash borer war. The MSU team tried various insecticidal treatments on trees infected with the insect, including a new experimental pesticide simply labeled EB. The method of treatment was tested too with some trees receiving a topical spray and others being injected in the trunk. Then the team collected leaves from the treated trees to feed to adult ash bores. The results indicated that the adults

emerald ash borer
Image by D. Cappaert, MSU, www.forestryimages.org

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Construction of Irrigation Trailer

With the purchase of approximately $1200 in steel last fall with Fiscal Year 2007 end-of-year monies, Plant Materials Center (PMC) Biological Science Technician Jerry Longren was set to construct a second irrigation pipe trailer. So you already have a pipe trailer, why would you build a second one? The answer is that we flood irrigate our foundation production fields, and we sprinkle irrigate the study plots and nurseries at the PMC. These different methods of irrigating require different pipes. So invariably when you need to sprinkle irrigate, the flood pipe would be on the trailer, and you would have to unload and reload the correct pipe to begin the job. All this loading and unloading wasted a lot of the summer crew's time. Now when we want to flood irrigate, that pipe will already be on the trailer ready to go and the same for the sprinkler pipe. This should make the irrigation tasks at the PMC much more efficient and effective. The following pictures show the steps in construction and the final product.

Finished Trailer

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Construction of Irrigation Trailer continued from page 1

Construction Phases

Longren checks alignment of trailer axle.

Trailer near completion as painting begins.

Trailer Welds

Gussets strengthen weld joints in truss-type construction of trailer, 90° gussets strengthen member joints, and 45° gussets increase welding surface.

Rich Wynia, PMC Manager, and Astor Boozer, acting STC, discuss historical aspects of the PMC.

STC Visit

Astor Boozer, Acting Kansas State Conservationist (STC) and Mark Janzen, Plant Materials Specialist (PMS), visited the Manhattan PMC on February 26. Astor had visited PMCs in Texas and Missouri before, but this was his first trip to the PMC. Boozer, Janzen, and the PMC Staff discussed the Plant Materials Program and the upcoming Quality Assurance Review to be held at the PMC the end of April. The group took a tour of the PMC facilities and fields in the morning and then sat down for lunch and friendly conversation. The PMC Staff is always glad to have visitors come to the PMC and discuss plants and conservation.

Field Study

A Manhattan PMC field study is scheduled to be planted in May. The study includes three accessions of blue grama in a 3X replicated randomized block design. One accession will be from the Nebraska Agriculture Research Service and the other two are potential releases from the PMC. The planting will also include two approved blue grama releases that are adapted to the planting site.

In addition to the blue grama, potential PMC forb releases of dotted gayfeather, leadplant, New Jersey tea, and compass plant will be planted. The forb plantings will include a seeded row and a row planted with vegetative material.

The primary focus of the study is to determine plant adaptability for future plant release documentation. The evaluation of the field study will be completed by the planting site hosts and plant materials personnel. The study is projected to last five years.

Initial planting is scheduled to begin this spring. Planting sites in Nebraska include: Lincoln, Bloomfield, Chadron, and North Platte. The Kansas planting site will be at Tribune. Additional planting sites in Colorado and Oklahoma are being planned for 2009.

If you would like additional information or are interested in hosting a future plant materials field study, please contact Mark Janzen, PMS, Salina, at 785-823-4595 or mark.janzen@ks.usda.gov

The Rest of the Story

In the winter 2008 newsletter, we just scratched the surface on tetrazolium testing (commonly referred to as a TZ). Seed laboratories use a TZ either to determine total viability, separate from a germination test; or to determine viability and thus, dormancy, on non germinated seed units at the end of a germination test. As a stand-alone test, a TZ is very useful by providing a quick estimate of seed viability, often within 24 hours after receipt of the sample. The results, however, cannot be used as an official test for labeling a seed lot. One must also understand that as a stand-alone test, a TZ does not indicate whether seed is dormant or non-dormant. When properly conducted, TZ and germination test results are generally in close agreement. For example, a seed lot of 'Barton' western wheatgrass was subjected to both tests. A standard germination test revealed a germination of 54% plus 24% dormant seed, for a total viability of 78%. A TZ on the same lot of seed was 73%. These tests fell within the allowed range of normal sampling variation, in this case 5 percentage points.

Why the variation? The difference may be entirely due to unavoidable sampling error. A representative sample of the seed lot needs to be taken to ensure an accurate test. A minimum of 200 whole seed units in replicates of 100 seeds or less are prepared for staining. Staining consists of placing the seeds, moistened for 14-16 hours, in a petri dish containing a solution of 2, 3, 5-triphenyl tetrazolium chloride (tetrazolium). The concentration of the solution varies depending on the seed to be tested. Whole seed units are tested with a 1.0% concentration, as in the case of legumes. Grasses such as fescue, ryegrass, and eastern gamagrass require only a 0.1% concentration since the seed units are bisected through the embryo just prior to staining. Staining times vary, but 6-8 hours is generally required depending on the species. When living cells absorb tetrazolium, the plant tissues stain red due to a reaction between the tetrazolium and hydrogen ions, a product of respiration. This indicates that the seed is alive since it is respiring but is not a guarantee of germinability. Performing such tests requires a great deal of knowledge about conducting germination tests. Knowledge of seed and seedling anatomy are required to correctly interpret the importance of stained and unstained seed structures and how it relates to seedling structures. Damaged tissues also stain red, a darker red, as damaged tissues absorb tetrazolium at a more rapid rate. The test is invaluable in its ability to get quick results. Keep in mind that it is not an official test; therefore, cannot be used for labeling seed that is for sale.

A TZ reveals damaged and undamaged seed units of eastern gamagrass recovered from soil.

Photo: John M. Row, NRCS

For more information consult *Tetrazolium Testing Handbook*, Contrib. No. 29, Association of Official Seed Analysts, Rev. 2000

~ John M. Row, NRCS, and Eric Fabrizius, Kansas Crop Improvement Association

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that were fed leaves from EB treated trees showed 100 percent mortality. As terrific as these results are, the down side to this news is that this pesticide can only be applied to landscape trees. It would be impractical to use on a wide scale to save millions of ash trees in forests, along waterways, and other natural areas. That's why the studies' unexpected discovery may prove bigger news than the pesticide control. The MSU team discovered that a small native wasp (*Atanycolus hicoriae*) was parasitizing the ash borer larvae. The wasp will lay its eggs on the ash borer larvae and when the eggs hatch, the wasp larvae will consume the ash borer larvae. In 138 log samples from 15 trees, it was reported that the wasp had parasitized from 6 to 80 percent of the ash borer larvae in the log samples. "We need to find out where this wasp came from, and why it is suddenly being effective in this particular region, whether it's a fluke, or will we see it be more effective next year," said research technician David Cappaert. "My personal guess is that it is a curiosity that won't pan out. But there is a real possibility that it could contribute to the control of the ash borer here in Michigan or even nationwide."

"Something has changed within this particular population of this wasp, maybe a genetic change, where they suddenly recognize the ash tree and an insect in there they can develop on," said McCullough.

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SEEKING VEGETATIVE SOLUTIONS TO CONSERVATION PROBLEMS

The mission of the Plant Materials Program is to develop and transfer state-of-the-art plant science technology to meet customer and resource needs. The primary products produced by the program include the production of improved varieties of plants for commercial use and the development of plant science technology for incorporation into the electronic Field Office Technical Guide (eFOTG).

We're on the Web!
www.plant-materials.nrcs.usda.gov

Scots Pine

Scots pine struck a cord with several of our readers in the winter edition of this newsletter. We are more comfortable with Scotch pine as the common name for the pine species *Pinus sylvestris*. Most older texts and literature used the name scotch while newer publications including the Plants Data Base seem to prefer Scots. Scots pine or red pine is a native of Scottish and English heath and mountains and native to western and northern Europe and Russia. The timber is variously known as red or yellow deal (UK), Scots, Baltic, Finnish, Swedish, or Polish pine depending on the origin. Since common names are not governed by any formal code of nomenclature, both names can be used.

Hortis Third appears to give the nod to Scots pine followed by Scotch pine and Scotch fir. At answers.com Scotch pine is shown to be synonymous with Scots pine.

The common name is not as important as the genus and species names. If we had included the genus and species, we would have all been on the same page whether we agreed on the common name or not.

As advisors, the common name may be more important to our clientele. Knowing and using the locally accepted common name for a species is important to them. We are not only understood, but people will think that for once we actually know something.

Scots pine Christmas tree plantation

Photo courtesy U.S. Forest Service Rocky Mountain Region Archive