

MILWAUKEE FORESTRY: *Managing EAB Risk with Ash Injections*

by Randy Krouse, Urban Forestry District Manager, City of Milwaukee, Wisconsin



Ash tree injection • Photo by Randy Krouse

The City of Milwaukee's Forestry Division has been preparing for the Emerald Ash Borer (EAB) since its discovery in metro-Detroit in 2002. The first three years of preparation were mostly spent gathering all the information known about EAB through on-going research, educational seminars, networking with industry professionals, and talking to representatives from communities infested with EAB. This learning process was invaluable and went a long way in developing Milwaukee's current EAB response plan. As we watched EAB spread quickly across multiple states, the Forestry Division decided to take three critical action steps towards preparing for EAB's inevitable arrival into the city.

The first step focused on risk assessment that included the completion of a computerized spatial street tree inventory, an i-Tree UFORE (now i-Tree Eco) ecological benefits analysis, and a hyperspectral imaging-derived ash classification. This step was necessary to understand how big of a problem EAB would be for the city, determine who and what was at risk, and to evaluate the impact EAB would have on existing operations and resource allocations.

Second, we turned from student to student/teacher by

educating our elected officials and budget office about EAB: What is it? Why is it a problem? What can we do about it, and what will that cost? What will it cost if we do nothing? The third step focused on risk management including an evaluation of chemical treatment options for Milwaukee's ash street trees.

In 2007 and 2008 the Forestry Division studied three trunk injection delivery systems to determine which method would provide a safe, reliable, and efficient way to annually treat a large number of public ash trees. A time study was conducted for each system on separate street tree plots to determine the most efficient delivery system.

In late 2008 a new chemical, emamectin benzoate, sold under the trade name TREE-äge, was given a 24(c) special use label in Wisconsin for the treatment of EAB. TREE-äge was unique because it showed potential to provide two to three years of protection against EAB, whereas other products studied required annual treatment. Milwaukee now had two tools needed to cost effectively manage risk accompanying an EAB outbreak.

To manage public safety risks associated with Milwaukee's 33,000 ash street trees, the Forestry Division initiated an ash street tree injection program in May 2009. The program targets ash trees 8 inch (20 cm) DBH or larger (approximately 28,000 trees) and provides two years of protection. Ash trees smaller than 8 inch DBH (approximately 5,000) will be preemptively removed and replaced with resistant species.

The Forestry Division plans to inject one-half of the ash street tree population annually over a period of many years while transitioning to alternative species. This strategy will allow forestry to effectively manage public safety risk associated with EAB and progressively remove 33,000 ash street trees on a schedule that does not significantly disrupt other important forestry operations such as pruning, tree planting, dead and hazardous tree removals, and boulevard beautification. We are hopeful



Hands-on injection training for City of Milwaukee forestry personnel • Photo by Randy Krouse

that this risk-management approach will lead to some preservation of ash street tree canopy and associated benefits while we transition into different species and improved species diversity of our urban forest.

Many other details had to be attended to prior to implementation of the ash injection program in May 2009. The first step was to find a vendor that could provide the injection equipment, a steady source of chemical, training for forestry staff, and on-site technical and product support within 24 hours of request. These vendor services were critical to ensuring the success of the program considering the amount of trees scheduled to be treated before September.

After a vendor was procured, the next step was to have field staff trained on hydraulic injection techniques, including setup, dosage determination, chemical safety and application, equipment maintenance, troubleshooting, and minor repair. The field staff was also trained on protocols set up by the Forestry Division for daily preparation, treatments, and end-of-day equipment maintenance and storage. A total of 30 Forestry employees were trained with the intent of having six two-person crews injecting ash trees on any given day while rotating

other trained individuals into the crews in order to ensure a large pool of skilled injection personnel. These training sessions were conducted in mid-May as the leaves of ash trees were starting to expand, which afforded field crews an opportunity to gain valuable hands-on experience prior to beginning full scale production work at the end of May.

A sound work plan was the last piece of the puzzle the Forestry Division needed to organize a systematic process for a high production injection program. The first decision was to start injecting ash trees from the northern half of the city based on its proximity to Wisconsin's first EAB find in Newburg, 20 miles north of the City of Milwaukee. Having an established starting point allowed the division to create working quarter section maps with supporting street tree inventory data that identified all the ash trees to be treated within a given quarter section (160 acres/65 ha).

Second, a decision was made to dose trees to provide two years of protection. Injection crews were provided detailed instructions on a tree-by-tree basis that specified the number of injection points per tree, milliliters of chemical per injection point (variable based on tree



Two urban forestry specialists treating a City of Milwaukee ash tree • Photo by Randy Krouse



Milwaukee Mayor Tom Barrett kicks off the City's ash tree injection program • Photo by Scott Baran, City of Milwaukee

diameter) and total milliliters of chemical to be injected. This attention to detail ensured that each tree was dosed properly, which is an important metric for a product that retails for over \$500 per liter! As quarter sections were completed, all maps and lists were turned into forestry management for review, data input, and recordkeeping.

To increase public awareness of the City's ash injection program, the program was launched with a press conference that featured Milwaukee Mayor Tom Barrett and Alderman Nik Kovac injecting the first tree and offering supporting comments. Milwaukee's EAB management strategies have also been reported in the *Milwaukee Journal Sentinel*.

Production was slow in the beginning as crews learned the nuances of tree injections and how best to organize a daily injection routine. The first week, each crew was treating 18 average size ash trees (14 inches/36 cm DBH) in one day with variability in production related to different tree and site conditions, microclimates, and equipment performance. As the weeks progressed, the overall production of each crew increased to an average of 34 trees treated per day during the peak of summer. This rise in production can be attributed to the increased proficiency of the crews and modifications made to equipment to increase their performance.

Each injection crew was responsible for posting pesticide warning signs for individual and contiguous blocks of treated ash trees under the guidelines of the Wisconsin Department of Agriculture, Trade and Consumer Protection. The signs contained information such as treatment date, tree species treated, target pest, chemical used, EPA registration number, and City of Milwaukee contact information. The pesticide application signs were not only a state regulatory requirement, they served as a positive public relations tool, notifying residents in the block that their ash trees were "safe" from the dreaded Emerald Ash Borer! A total of 13,200 ash trees were injected in 2009, covering approximately the northern geographical half of the city. An estimated 15,000 ash trees will be injected in 2010.

The ash tree injection program has proven to be a highly cost-effective method for managing public risk associated with EAB. Milwaukee's injection cost per tree, including materials and labor, averages \$58.00 for a 16 inch (41 cm) DBH tree. The comparative cost to remove and replace a 16 inch DBH tree with a 3 inch (76 mm) caliper shade tree approximates \$750.00. As research has shown TREE-age to provide essentially 100% protection for two years, the injection program allows the Forestry Division to transition its ash tree population to resistant species over a period of many years on a schedule that can be completed with existing staff and

resources, not on a crisis-management schedule driven by beetle-killed trees.

While an added maintenance program and expense, the tree injections prevent the catastrophic loss of 17% of Milwaukee's street tree population over a short period of time and their associated ecological service benefits, including the sudden loss of all trees in residential blocks forested exclusively with ash. The tree injections also enable the Forestry Division to continue providing other valued core services such as cyclical pruning, tree planting, boulevard beautification, tree protection, and tree removal while effectively managing public risk accompanying an EAB outbreak.

As the tree injection delivery system selected delivers the precise amount of chemical needed directly into the trunk of the tree, treatments can be safely made without any risk of accidental exposure to people or pets, which is appreciated by the public. Precise chemical delivery also ensures proper dosage for effective control and eliminates the potential for pesticide resistance caused by sub-lethal dosing.

While many lessons were learned in the process of building a large-scale injection program, the City of Milwaukee Forestry Division is confident that the injection strategy adopted represents a win-win for both Milwaukee residents and their urban forest. 🍃

Key Words

Ash Tree Injection

Emamectin benzoate

Emerald Ash Borer

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TREE-äge

ADDENDUM

In addition to the committees mentioned in President Gene Hyde's column in the Jan/Feb issue of *City Trees*, the newly formed Exhibitor and Sponsor Committee welcomes new members. Please contact Exhibitor and Sponsor Committee Chair Jeff Wooten at JeffWo@ci.clovis.ca.us if interested in participating in this vital committee.



urban forest FOUNDATION

One of the purposes of the Urban Forest Foundation is to promote the practice of professional municipal arboriculture. Contributions to the Foundation support programs like the Municipal Forestry Institute (MFI) that has established itself in five years as a valuable professional development opportunity for urban forestry professionals. As the program evolves, it is reaching a broad audience and making a greater impact in our urban forests than ever before.

Cities and state forestry agencies are recognizing how the MFI helps to build depth in understanding and leadership among staff and key partner networks. It is not a coincidence that alumni of the MFI currently serve in key and emerging leadership posts across the nation. They are a well prepared and forward thinking group of urban forestry advocates.

This year another class gathered to learn, share and grow at MFI, when they met at the Lied Lodge & Conference Center at Arbor Day Farm in Nebraska City, Nebraska. It is unlikely that there could be a more fitting venue for a training aimed at fostering new leadership and voice for the importance of trees than Arbor Day Farm, the home of Arbor Day.



Lied Lodge & Conference Center at Arbor Day Farm, a world class training facility, was established to create an inspiring learning environment that nurtures the soul and the minds of tree advocates around the world. Connecting the newest class of MFI leaders with the more than 130-year-old history and ideology of Arbor Day adds another important ingredient to this exciting and growing program.

Learn more about the Urban Forest Foundation, Municipal Forestry Institute, and the Lied Lodge & Conference Center at Arbor Day Farm by visiting www.urban-forestry.com or www.liedlodge.org. —Dan Lambe, Vice President, Programs, Arbor Day Foundation.

