

Emerald Ash Borer Control Project Mendakota Country Club

By **BOB MCKINNEY, CGCS**
Mendakota Country Club

Bob McKinney, CGCS of Mendakota Country Club has been employed by the club for 35 years. He was hired by Harold Stodola in 1974 and has been Superintendent for the past 19 years.

Mendakota Country Club is a private club in Mendota Heights, Minn. The course is on 130 acres. We've been averaging approximately 22,500 rounds per year the last six years.

What is known as Mendakota Country Club began its golf history in 1926 when Louis Fischer laid out five holes in his pasture land using empty tin cans for cups. By the end of the first year they had nine holes. By 1929 "the course" was expanded to 18 holes. Eighteen grass greens were constructed in 1933 allowing the course to be awarded the 1934 State Publinx Championship. Somewhere along the way the course was named Riverview Country Club, a name that stuck until 1942 when it was changed to Twin City Country Club. In 1956 the club was sold to a corporation made up of members and in 1957 the name was changed to Mendakota Country Club.

What Prompted You To Consider 'In-House' Tree Injection?

As reports of Emerald Ash Borer (EAB) discoveries got closer to the Minnesota border, I became much more interested in learning more about this pest and methods to control it. I took an inventory of Mendakota's ash trees to determine not only how many we have, but also what effect it could have on our golf course if we lost all of these trees. Unfortunately for us, I found we have over 350 ash trees on the course and most of them play a very important role either strategically or aesthetically to our course. Many of our golf holes would be devastated without them. Also, our ash trees are large, averaging 20



inches in diameter.

I have to give my friend, Kevin Manley, who works for JRK Seed, a lot of credit for helping me understand this pest and the various control methods being used for control. I attended two seminars put on by JRK Seed and Arborjet and researched all I could find on the internet about EAB. The research being done by professors Smittley and McCullough at Michigan State University is extremely useful. Everything I learned steered me towards injecting our trees "in house" using Arborjet equipment and the insecticide Tree-äge. There are a number of reasons why I chose Arborjet and Tree-äge but basically this method has proven to be the most effective and environmentally safe product to date for controlling EAB.

I reported my thoughts and plan of attack to my committee and Board of Directors. The plan was to inject 300 of our 350+ ash trees at a cost of \$70 per tree. At this cost, I could treat our trees for 25 years compared to the cost of removal and replacement. We all agreed that this golf course could not afford to lose these trees. Mendakota assessed each of its golf members \$100 to cover the cost of injection. I would say that our members welcomed this assessment.

I would say the injection method is very simple and easy to use. A bit of a

learning curve at first but after six trees or so it really goes smoothly. The process is basically measure, drill, plug, and inject. First the tree diameter is measured at breast height (DBH). I use a special tape measure made for measuring tree diameter. I then look at a "use rate table" that will tell me the number of injection sites per DBH as well as volume of Tree-äge to be injected. For example, a 20" DBH tree will require 8 injection sites and 110 ML of Tree-äge. Using a cordless drill with a 3/8" bit, 8 holes are drilled approximately 1-5/8" deep and as evenly

spaced as possible around the tree.

Typically the holes are drilled about 6" up from ground level and away from damaged areas of the tree or compressed bark areas. Root flares are excellent locations for injection sites. Arborplugs are then tapped into these holes. An arborplug is a plastic "plug" with an internal septum which keeps the injection site leak proof. Two I.V. bottles with four delivery tubes each are used to deliver the product. I've been using one part water and one part Tree-äge for my mix whereby I'll add 55 ML of each to each bottle for a total of 110 ML for this tree. Using the Arborjet hand pump, each bottle will be pressurized to 60 psi. There is a blow-off valve on each bottle that limits the pressure to 60 psi. The delivery tubes which each have a needle and valve at their ends are then purged of air before being inserted into the arbor plug. The valves are then opened and the mix flows into the tree. I would say that it takes about 15 minutes for this entire process.

The best time for injection is when the trees are fully leafed out in the spring and actively transpiring. Typically, it takes more time for drilling and set up then it takes for the product to move into the tree. I've had it take from seconds to hours for the bottles to empty.

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Is the Process Economical?

I purchased the Arborjet Tree I.V. two pack kit for \$599 which gives you everything you need to get started except for the cordless drill. I added two more Tree I.V. units at \$199 each to help speed up my program. I first scoffed at the price of this equipment but after a season of use I feel that the Arborjet equipment is worth every penny, very durable and easy to use.

Also, keep in mind that this same equipment can be used to inject nutrients or fungicides into your trees. We injected a chlorotic oak with iron and a chlorotic maple with manganese this past season. I began injecting trees mid-summer and stopped in late September. Each tree that has been injected has also been tagged with a number. I keep a log with date of injection, size, location, volume of Tree-äge injected, and current appearance. I've injected 256 ash trees to date and will treat another 35-40 next season.

Any Special Licenses?

A pesticide license, an Arborjet kit, and Tree-äge is all you need to get started. Keep in mind that this pest is relatively new and that control measure research keeps coming in. All of the data that I've come across tells me that I've chosen the best possible method to combat this pest. The research tells me that my trees are going to be protected for at least two years and I wouldn't doubt that by this time next year I'll find that this single treatment will be good for three years.

Some Math:

Tree-Age case price = 53¢/ML

20" ash = 110 ML - 110 x .53 = \$58.30

Arborplugs @ 59¢ ea - 8 x .59 = \$4.72

\$58.30 + \$4.72 = \$63.02/20" tree for two years or \$31.51/year

300 x \$63.02 = \$18,906 (good for at least two years)

Versus:

300 trees x \$250 removed = \$75,000

300 trees x \$50 stumped = \$15,000

300 x \$500 tree replacement = \$150,000

\$240,000 could treat our ash trees for 25 years minimum.

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Tree Injection Hillcrest Golf Club of St. Paul

By THOMAS SCHMIDT

Superintendent, Hillcrest Golf Club of St. Paul

I am the Superintendent at Hillcrest Golf Club of St. Paul and have been a Superintendent 10 years.

Hillcrest is a private golf club with 12,000 to 15,000 rounds per year.

Hillcrest was a public golf course that opened in 1921. Hillcrest was established as a country club in 1945.

I have been injecting my trees at Hillcrest for six to seven years, I started out treating the elm trees and have since moved on to injecting insecticides for the Japanese beetle. After injecting, we would see the beetles on the ground around the tree. The numbers of dead beetles were in the thousands which helps my cause because they are not laying their eggs in my turf. This helped reduce my beetle count tremendously and I have seen a huge reduction in damaged turf and trees.

My tree injecting budget was \$4,000 a year just for the elm trees. I spend 1/3 of that now and am treating more trees. I have saved my club approximately \$17,000 over the period of six years with the Arborjet tree injection system.



Superintendent Tom Schmidt injects a tree at Hillcrest Golf Club of St. Paul.

This system, I found at the National show year's ago, has paid for itself many times over, it is easy to use, fast and very user-friendly.

With the ash borer approaching I will

be treating 40 key ash trees over the next couple of years and will hopefully save our club trees and our pocket books.

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Ash Trees and the Emerald Ash Borer Minnesota Valley Country Club

By Michael J. Brower
Superintendent, Minnesota Valley CC

Introduction

Many destructive wood boring insects exist in the United States, but rarely do they cause widespread and destructive damage to large populations of trees. As a wooded, parkland type golf course with over 1200 mature trees, a destructive wood boring insect outbreak could have a big impact on Minnesota Valley Country Club's trees. Over the past six years, citizens across the Midwest and beyond have been keeping track of the spread of a destructive wood boring insect called the Emerald Ash Borer. This report takes a closer look at the Emerald Ash Borer and how it could affect the ash tree population at Minnesota Valley Country Club.

The Emerald Ash Borer

The Emerald Ash Borer (EAB) is a species of metallic wood boring beetle that attacks ash trees, typically killing trees in one to three years. Tree mortality is caused by the larvae or immature stages, which tunnel and feed underneath the ash tree's bark. Once these galleries of larvae take up residence under ash tree bark, they quickly consume the conductive tissue of the tree, essentially shutting down the trees uptake of water and nutrients and killing it. They attack all species of ash and have been very destructive in southeast Michigan and surrounding areas of the Midwest, destroying millions of trees. A native of Asia, it was first discovered in the Detroit, Michigan area in 2002, and is now found in at least 10 states. The insect was found in Wisconsin in July of 2008, in northwest Washington and northeast Ozaukee counties, around the village of Newberg, approximately 150 miles north of Chicago and 350 miles southeast of Minneapolis-St. Paul.

The Spread of the Emerald Ash Borer

The most likely and evident source related to the spread of the problem is with infested firewood that is transported out of infested areas into other states. The insect can also be transported in infested nursery stock and ash logs. There are several levels of quarantines being adminis-



Two small Ash.

tered by both state and federal agencies in all of the affected states. All counties in the lower peninsula of Michigan are under some form of quarantine. There are also federal and state quarantines in four southeastern Wisconsin counties. Current containment of the EAB varies from state to state, and includes elimination of ash trees in infested areas, extensive surveying of high risk areas, implementation of quarantines for ash products, and insecticidal treatments of infested trees and non-infested trees in high risk areas.

Minnesota Valley Country Club Ash Tree Population

There are approximately 230 ash trees on MVCC property. They include three types of ash tree, the green ash, the blue ash, and the black ash. The predominant species is green ash, *Fraxinus pennsylvanica*. All are susceptible to hosting and damage from the EAB. The ash tree population at Minnesota Valley is spread throughout the golf course. However, seven distinct areas of the golf course account for more than half of the population. In each of these areas, ash trees are either the dominant tree species in the area or have a group of large ash trees that dominate the immediate landscape. Each of the areas would be greatly impacted by the loss of ash trees. The following is a list of the

seven areas on the golf course that would be most impacted by the loss of ash trees. The list totals 118 ash trees, or approximately 51% of the total. The remaining 49% are spread out over the course and mixed in with other deciduous and evergreen trees.

- A) Hole #18: Five large ash trees on the right side of the first landing area.
- B) Holes #1 & 16: Thirty medium to large ash trees that are the dominant tree species in the rough between these golf holes.
- C) Hole #10: Ten medium to large ash trees in the right rough.
- D) Hole #8: Twenty-two medium ash trees in the left rough and behind green.
- E) Holes #13/14- Twenty ash trees spread out between the two holes.
- F) Holes #4/5- Twenty-five ash trees spread out between the two holes.
- G) Hole #6- Six large ash in the right rough.

Estimating Values of Ash Trees on the Golf Course

Any reasonable management plan for a golf course with a considerable number of ash trees would most likely be a combination of management procedures. The

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first step in a management plan would be evaluating each ash tree in the landscape to assign a relative value based on its position in the landscape of the golf course, its condition, the cost of removing and replacing the tree vs. attempts to keep it alive, and the willingness to invest resources in it over time. A likely starting point in the evaluation of ash trees on the golf course would be to place each into one of the following three categories.

A) Low Value Trees: Ones that are not integral to the landscape and that one does not wish to invest resources in to protect chemically, and ones in poor condition.

B) Moderate Value Trees: Ones that may be integral enough to invest resources in to protect chemically and are in good condition.

C) High Value Ash Trees: Ones which are very important to the landscape and warrant investing resources in on a yearly basis. Trees should be in good condition initially.

Preventative Insecticide Treatments

One insecticide that has shown promise in protecting ash trees from EAB is Imidacloprid.

Imidacloprid is a systemic insecticide that can be sprayed as a soil/bark drench or injected into the tree. The spray drench is the most common practice, and has been fairly effective in the control of EAB. The injection method is not as common on golf courses due to the large number of trees and the higher cost associated with it. It is however, the most effective and predictable treatment as the insecticide is immediately taken up by the trees conductive tissues. The drench method is also effective, but is less predictable, and takes several weeks for the insecticide to be fully taken up by the tree. Golf courses in high risk areas of Michigan and Illinois have, with varying degrees of success, reduced the loss of trees with preventative applications of Imidacloprid.

The following excerpts are from conversations I've had with other Golf Course Superintendents in high risk areas. Steven Sarnowski, Superintendent at Raisin River Golf Club, in Monroe, Michigan stated, "I cut our first dead tree from EAB down in January of 2001. We've been treating about

300 trees with Imidacloprid since 2003. Any trees we have not treated are dead, and that's around 400. Of the trees we have treated, we've lost about a dozen with another 20-30 with significant damage. We spend about \$10K per year on treatments, removal, and pruning." Robert Green, Superintendent at Sunset Valley GC, in Highland Park, Illinois stated, "We have been in a quarantined county for about one year. We have the pest and have continued to treat about 10% of our ash population with Imidacloprid. The remaining 400 ash trees on the property will probably succumb to the pest in a rather rapid period. My best advice came from Superintendents in Michigan, that said start cutting ash trees now so you're not faced with the sudden death of hundreds of trees." Dr. Dave Roberts of Michigan State University, who was the first person to discover and properly diagnose the EAB in the Midwest, stated, "we have clearly demonstrated that we can have 100 % success in preventing EAB infestation in ash trees with a combination of Imidacloprid and nutrients injected into the tree every two years."

It's recommended that treatments be made in early spring, with some differing opinions on how frequent these should be. It is quite typical for golf courses in the high risk areas to treat high value trees annually. The suggested rate of Imidacloprid using the drench method is .2 ounces for each 1" of trunk circumference. The current cost of Imidacloprid is \$312 per gallon. For a standard 30" circumference ash tree, the cost of one drench application would be \$14.62. Therefore, one gallon of Imidacloprid (\$312) would be sufficient to drench approximately twenty-one 30" circumference trees. These applications could be completed using MVCC staff and equipment. Total cost of Imidacloprid needed to treat all 230 of MVCC's ash trees, using a 30" circumference average is estimated to be \$3,412 on an annual basis. Using the same average circumference, drenching the 118 trees in the previously listed seven distinct areas of high impact would be an annual cost of \$1,740. Any additional nutrients to the drench application would increase the cost.

Pruning and Removal of Trees

Several factors determine the cost of cutting down and removing a tree. These factors include; location of the tree, size of

the tree, species, cutting and removal methods, method of disposal, time of year, and who is performing the cutting and removal. The current practice at Minnesota Valley is removal of medium and large trees by a professional arborist who is trained and equipped to perform such work. Small tree removal and ground pruning is routinely performed by MVCC staff. The majority of this work is completed during the winter months. In recent years, the majority of this wood has been burned on site, greatly reducing the overall cost. Removal of a single tree vs. a large quantity of trees also factors into the cost of tree removal.

When cutting and removing a large quantity of trees, overall cost is typically reduced substantially. Overall, there are a number of factors that are involved in determining the cost of tree removal. My best estimate on the cutting and off-site removal of all 230 ash trees on the golf course would be as follows. Single medium or large tree removal at \$800 each by a professional arborist and removed off-site. To remove the current 230 ash tree population at \$800 each would amount to \$184,000. I'm confident that this expense could be reduced by negotiating costs and/or burning of material on-site. Insect infestation and the subsequent cost of removing infested trees that die, is not a listed item on the club's tree insurance policy. A claim, could however be made at the time of infestation and removal, in an attempt to have the cost covered. The overall cost could and most typically would be spread out over several years depending on preventative treatment strategies.

Summary and Conclusion

The nearest confirmed location of EAB in Wisconsin, is over 350 miles away from Minnesota Valley. In addition, the population of the EAB pest in that location is very minor at this time. There are also state and federal quarantines in place in all affected states, including the effected counties in Wisconsin. Given this information, there appears to be no immediate high risk of the pest arriving here. This should allow the needed time to further analyze the value of the ash trees on the golf course, investigate preventative treatment options, and establish and adopt a management plan for the ash tree population at Minnesota Valley Country Club.



Ash under an Elm

Minnesota Valley CC Ash Tree Update - July 2009

- Summer of 2008: MVCC Green Committee discusses locations and threat of the Emerald Ash Borer, and initiates a detailed evaluation of MVCC's ash tree population.
- October 2008: Superintendent Brower presents a report to MVCC Green Committee on the Emerald Ash Borer, its spread through the Midwest, an inventory of MVCC's ash trees, and possible strategies for managing the ash trees and preventing damage from the insect.
- October, 2008:- MVCC Green Committee unanimously decides to treat approx. 150 of MVCC's ash trees with a drench application of the insecticide, imidacloprid, in the spring of 2009.
- May 13, 2009: The discovery of the first known population of Emerald Ash Borer in Minnesota. Several dozen trees in St. Paul, near I-94 and Hwy. 280 are found to be harboring the insect and are removed.
- May 14, 2009: The Minnesota Dept of Agriculture issues a State Emergency Quarantine of the Emerald Ash Borer and ash tree wood for Ramsey, Hennepin, and Houston counties.
- May 19-20, 2009: All 230 of MVCC ash trees are treated with a drench application of the insecticide, imidacloprid. Total cost \$2,920.
- June 2009: MVCC Green Committee discusses future ash tree management strategies and makes decision to further evaluate each ash tree on the property to determine the best strategy for each tree.
- June 2009: Superintendent Brower begins evaluation of ash trees on the property, gathers additional information on the state quarantine and possible management strategies for 2010 and beyond.
- July 2009: MVCC Green Committee begins discussion of future management strategies for its ash tree population.

Minnesota Valley CC Summary of 2010 Tree Management Plan

- Tree Inventory records shall be updated and reproduced during the winter months to better reflect current conditions and relative values of trees.
- Relative values will be assigned to all ash and elm trees within the inventory, based on a three level scale of low, moderate, and high values.
- Using the relative values assigned to ash trees as a guide, an annual preventative chemical treatment program will be administered to prevent damage to the ash tree population from the Emerald Ash Borer. A drench method will be utilized to protect all ash trees, and in addition, several high value trees will be chosen for an injection method.
- Using the relative values assigned to elm trees as a guide, an annual preventative chemical treatment program will be administered to prevent damage to the elm tree population from Dutch Elm Disease. An injection method will be used to protect these trees.
- Any recommendation for removal of trees of any species should be made to the Superintendent and/or Green Committee for review and evaluation, and shall be pursuant to the process outlined in the MVCC Tree Management Policy. Recommendations for tree removal should be made far enough in advance so that the review and evaluation can be completed in the golf season, and the tree can be removed during the winter months.
- New tree plantings shall be completed in the spring pursuant to the process and guidelines in the MVCC Tree Management Policy, using the funds budgeted for tree planting within the Operating Budget.
- Pruning of trees to maintain their safety, function, and aesthetic appeal shall occur primarily in the winter months, using funds budgeted for pruning within the Operating Budget.
- All tree management strategies will be completed using the funds budgeted for trees in the 2010 Operating Budget as follows.

January:

Pruning and Removals (\$11,000)

May:

Ash Tree Chemical Treatments (\$4,000)
New Tree Plantings (\$2,000)

July:

Elm Tree Chemical Treatments (\$6,000)