The Economics of Dying Ash Trees in Connecticut

Richard S. Cowles
Connecticut Agricultural Experiment Station, Valley Laboratory

Cash-strapped towns and cities in Connecticut are faced with an added challenge and responsibility: dealing with dying ash trees. As has been true in the Midwest, the arrival of emerald ash borer (EAB) progresses about 3 – 5 years ahead of when they are detected. Many ash trees are now dying in Connecticut, and others that are still apparently healthy are infested and will soon show signs of injury. If left untreated, cities will be faced with removal of all their ash trees over the course of about four years, which could have disastrous budgetary consequences. Treating the most valued ash trees can preserve their value and shift the tree removal process to our schedule, rather than on the schedule of EAB infestation dynamics, unmanaged tree death, and response to imminent risk from branch failure. This article details some management alternatives for municipal trees.

Certain principles are key to planning a course of action:

- Preserving forest canopy maximizes the benefits having trees. Thus, large trees are most valuable.
- Small trees are relatively inexpensive to remove, and are quickly killed by EAB.
- If there is greater than 40% crown dieback in a tree, that tree cannot be saved with insecticides.
- Any tree with less than 40% crown dieback can be a candidate for preservation.
- Following initial infestation, the percentage of trees infested and dying typically doubles each year until the number of trees remaining becomes limiting to of EAB population growth.
- Ash trees become hazardous approximately nine months after dying, due to limb breakage.
- Because of weak limb attachment, dead ash trees must not be climbed for removal. This can mean that it will be more expensive to remove a dead ash tree than removing the same tree when it is still alive.
- The costs of removing trees should also include stump grinding and disposal of the solid wood waste. Municipalities with large numbers of ash trees may find it difficult to find arborists to remove trees, because there will be such high demand for tree removals throughout the state. The logistics for disposal of trees can be difficult because of the large volume involved. Tree removals can be anticipated to cost $500 to upwards of $1,500 per tree.
- Cities attempting to maintain their urban forests should be replacing removed trees. This will add another $200 to $500 for every ash tree that is removed.
- Not all live ash trees should be saved. Some have defects that warrant removal, irrespective of EAB.

How much does it cost to treat trees with insecticides to preserve them from EAB? There are several treatment options available, each of which has its advantages and disadvantages.

(1) For individuals and municipalities in which cost is not a limiting constraint, trunk injections with emamectin benzoate products (TREE-äge or Arbormectin) is the most effective treatment. This insecticide kills larvae within the tree, as well as adults that feed on foliage before laying eggs (maturation feeding). A single application will provide at least two years of effective control of EAB. Therefore, a city could treat half of the ash trees it wishes to save one year, and the remaining trees the next year. Assuming a cost of $520 for 1000 ml of product, and the low rate dosage of 0.1 g a.i. per inch DBH (2.5 ml product per inch DBH), the chemical cost for treating ash with emamectin benzoate is $1.30 per inch DBH. Because it only needs to be applied on alternate years, the average cost is $0.65 per inch DBH per year. The application cost is much greater than with soil injection or trunk sprays. In cost calculations, I assume that application cost would be $6 per inch DBH, per application. Where there are exceptionally valuable, large, and historic trees, emamectin benzoate products should be considered for two treatments, two years apart, as the "killing front" of beetles moves through a neighborhood.

(2) Where funds are extremely limited, soil drench or shallow soil injection with imidacloprid (Merit, Xytect, many generic names) becomes an overwhelmingly favorable treatment option. This insecticide is no longer protected by patents, and so generic products are available for approximately $50 per gallon for flowable liquid products that contain two pounds active ingredient per gallon. Treatment dosages are 1.44 g a.i. per inch DBH (grams active ingredient per inch diameter at breast height) for trees less than 15 inches in diameter, or 2.88 g a.i. per inch DBH for larger trees. These dosages translate into annual costs of $0.78 per 10 inches DBH for smaller trees, and $1.56 per 10 inches DBH for larger trees. Unlike emamectin benzoate, imidacloprid must be applied every year to be effective. It is slow to move into and throughout the canopy; so early springtime applications are best for using this active ingredient. A very efficient application device for treating these trees is the NuArbor 1-Two Root Injector (~$500 per unit). It takes about 2 – 3 minutes to treat a single tree with this device.

(3) If there is a need to quickly get insecticide into a tree that already is showing branch dieback, and it is too late in the spring to apply imidacloprid, then a basal bark spray with dinotefuran (Safari, Transtect) can be effective. Assuming a cost of $345 for 3 lb. of Safari 20SG, the cost of this option is $1.01 to $2.65 per inch dbh per year, or cumulatively (including application cost of $3 per inch dbh per year) a cost of $401 to $565 for a 10 inch DBH tree over 10 years, including application cost of $3 per inch DBH per year.

(4) At sites not surrounded by hardscape or aquatic resources (streams or ponds), a foliar spray with a long-residual insecticide may be an inexpensive option to target for targeting adults during their maturation feeding. An effective active ingredient to consider for such a treatment is bifenthrin (Onyx, UpStar Gold, other generic names). By itself, a bifenthrin spray for a large tree could cost about $12 for insecticide, and additional labor and cost for the application. This option could also be used in addition to soil drench with imidacloprid for very large ash trees

(over 30 inches DBH), to avoid multiple years of drilling historic trees to treat with emamectin benzoate. The rationale behind this approach is that systemic insecticides are diluted within the canopy of the tree. As tree canopy increases in size, the dosages of a systemic insecticide may no longer permit a fully effective treatment. The effectiveness of a foliar application of bifenthrin is independent of tree size (as long as the foliage can be sprayed), and so such a spray could make up for any inadequacy of soil imidacloprid application.

Overall cost comparison is given for a hypothetical 10 inch DBH tree:

Option 1. The least expensive program for a city would be for its own employees to make applications to every live ash tree with imidacloprid, excepting those trees that should not be saved with this treatment. Assume that an employee doing the treatment is getting paid $22 per hour – with fringe, etc. – let's round this up to $30 per hour or $240 per day. Let's also assume that the individual doing the treatment is able to treat on average 30 trees in a day, using, of course, a municipal vehicle to travel around town. To keep the numbers simple, let's add $60 in overhead to the $240 in labor cost – or $300 for 30 trees. This works out to $10 per tree annually or $100 labor cost over 10 years. Accumulated over the course of ten years, the chemical costs would amount to an expense of about $8.00. Combined with the labor cost for this tree, the combined cost is $108. This strategy requires that there be a licensed arborist on the staff, and at least one employee with a pesticide operator's license doing the insecticide application. Governmental employees do need to have an operator's license, but there, for governmental employees, there is no fee for that licensing (CGS 22a-54-2).

Option 2. Treat with imidacloprid soil injection in all but four years, during which the tree would be protected by emamectin benzoate trunk injection. The total cost would be about $30 for chemical costs, and $240 for a contract arborist for soil and trunk injections, for a total of $270.

Option 3. Contract an arborist do the imidacloprid applications. Assuming a contract cost of $3 per inch DBH to treat the tree, every year. This would give chemical costs of $8 and contract labor cost over 10 years of $300, for a total of $308.

Option 4. Remove the tree and replace it with a 2 inch DBH tree. Cost of removal may be $1,200, stump grinding, $200; and tree replacement $600, for a combined cost of $2,000.

Summary

Municipalities need to face the reality that trees form a valuable living part of the infrastructure. Maintaining a healthy tree canopy by conserving urban ash trees can be much less expensive than allowing emerald ash borer to kill these trees, which then necessitates rapid removal of dead trees. Preventing the infestation of EAB from causing trees to decline to the point where they can no longer be kept alive should be a top priority of city managers, to protect its citizens and their property from falling tree limbs, to maintain the environmental

services that living ash trees provide, and to contain the costs associated with damage caused by emerald ash borer.

July 15, 2016