

The Emerald Ash Borer Comes to Bristol

Enterprise Drive is a 0.57 mile road through a corporate park in Bristol, CT. Right off of Route 229 and just south of the center of the small city (population 60,568 in 2013), Enterprise Drive is part of the very busy and successful commercial district that includes, among its most high profile businesses, ESPN, Lake Compounce and the Otis Elevator Research Facility.





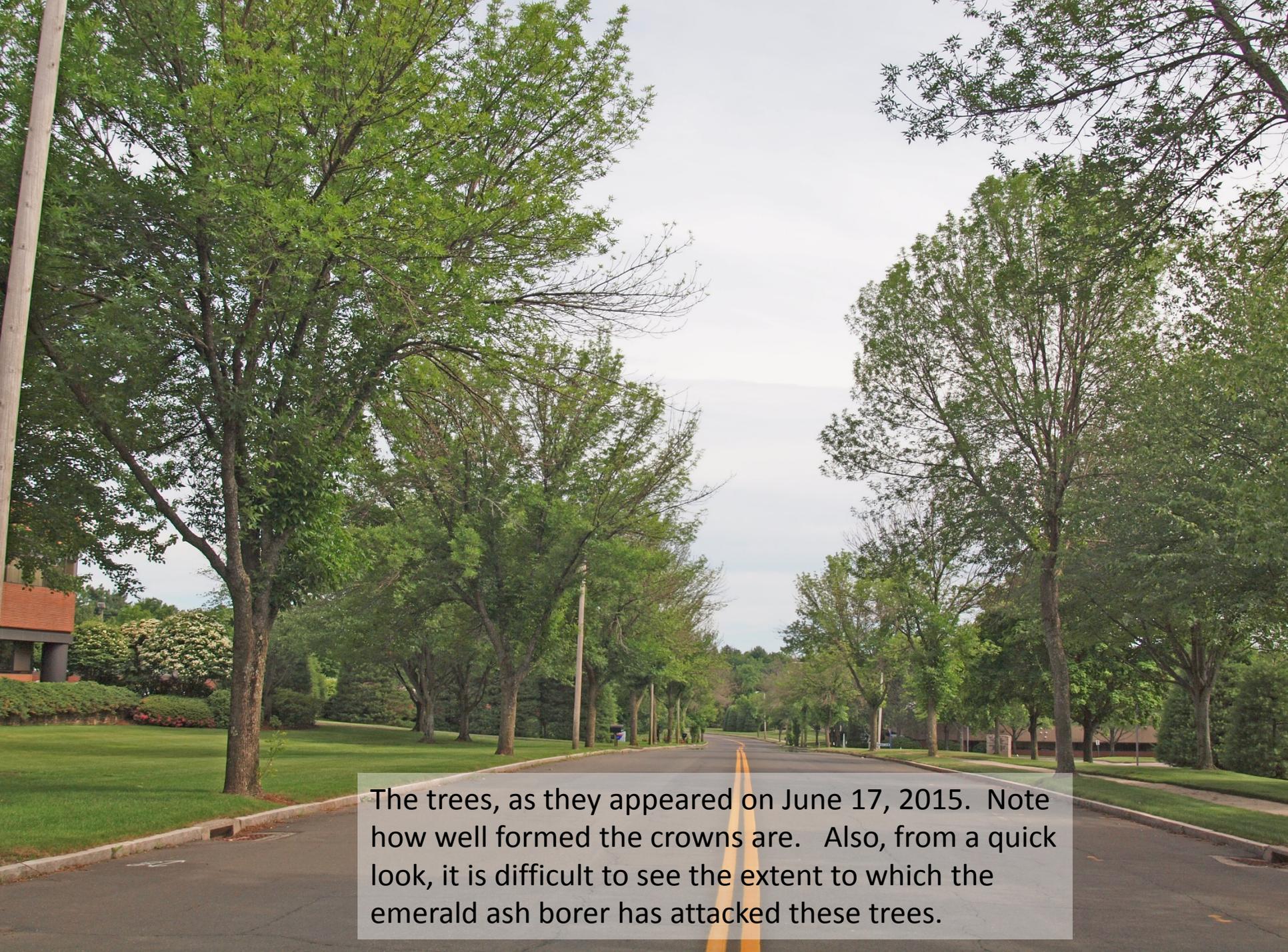
EAB larva



EAB adult

When Enterprise Drive was constructed, no one had even heard of the emerald ash borer. The street was planted with some 60 green ash trees that grew to be between 11 and 17 inches in diameter (dbh). It was an ideal planting site – few sidewalks, wide lawns, no overhead wires. This is the sort of planting site that seemed to invite an allee of large shade trees to give beauty and attractiveness to the road.

What follows in the next several slides is the story of what happened to those trees. It is an overview of the signs of an emerald ash borer infestation, along with an afterword on lessons learned, including what might have occurred differently had circumstances been changed.

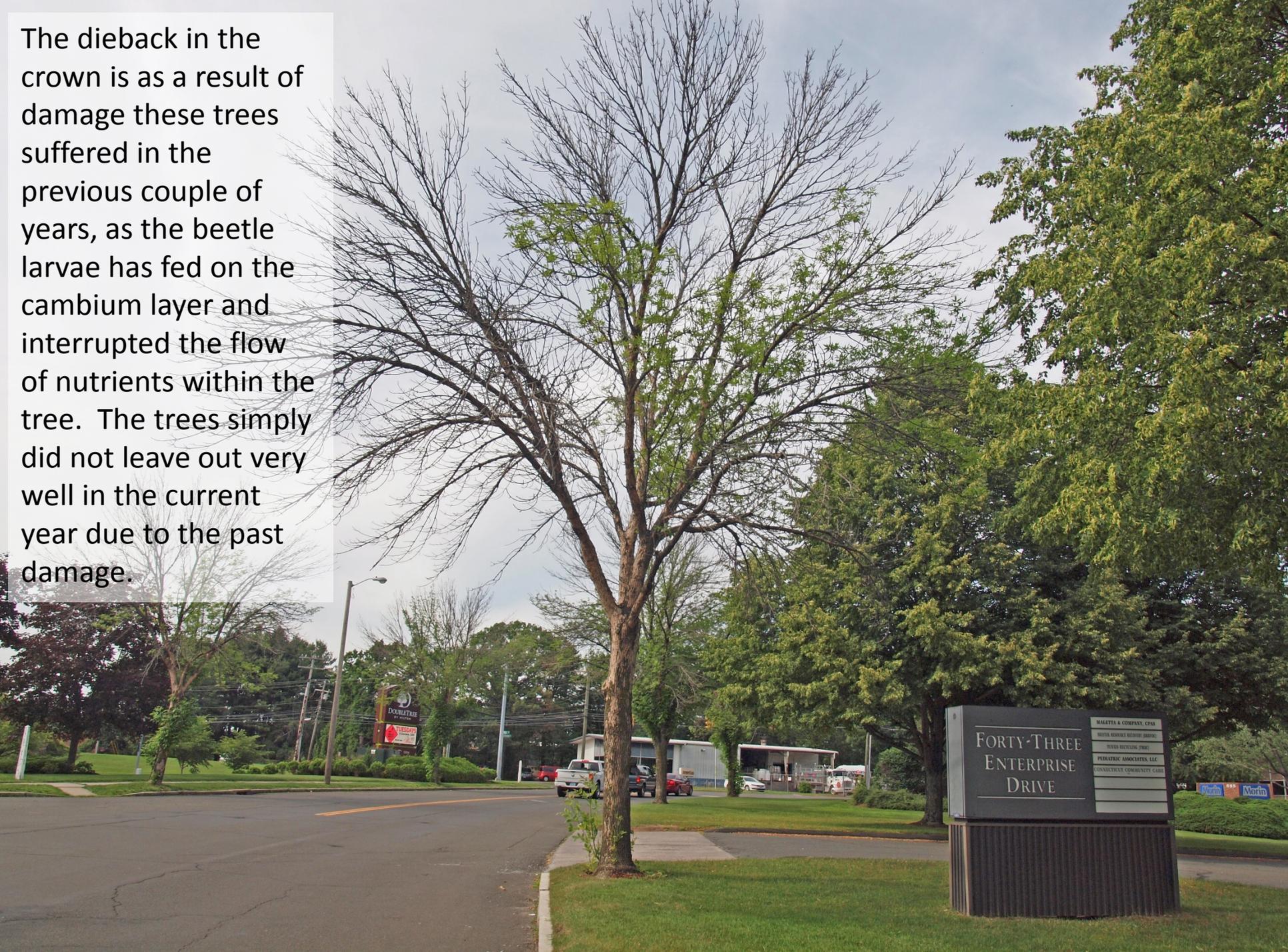


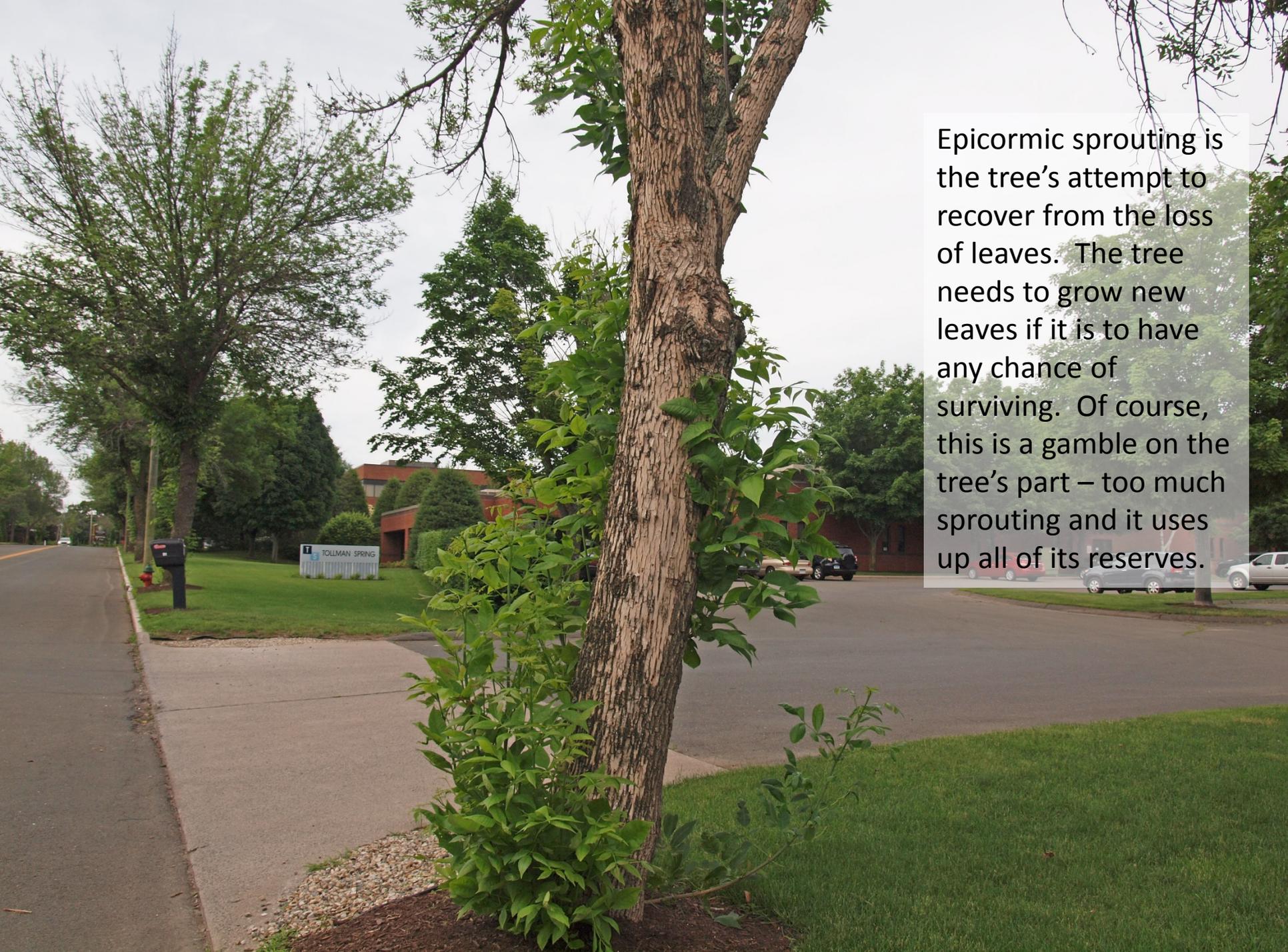
The trees, as they appeared on June 17, 2015. Note how well formed the crowns are. Also, from a quick look, it is difficult to see the extent to which the emerald ash borer has attacked these trees.



Further down the road, the indicators of the stress on these trees from the beetle are more apparent. On these trees, one can see defoliation, epicormic sprouting and, if one looks very carefully, some 'blonding' of the bark.

The dieback in the crown is as a result of damage these trees suffered in the previous couple of years, as the beetle larvae has fed on the cambium layer and interrupted the flow of nutrients within the tree. The trees simply did not leave out very well in the current year due to the past damage.

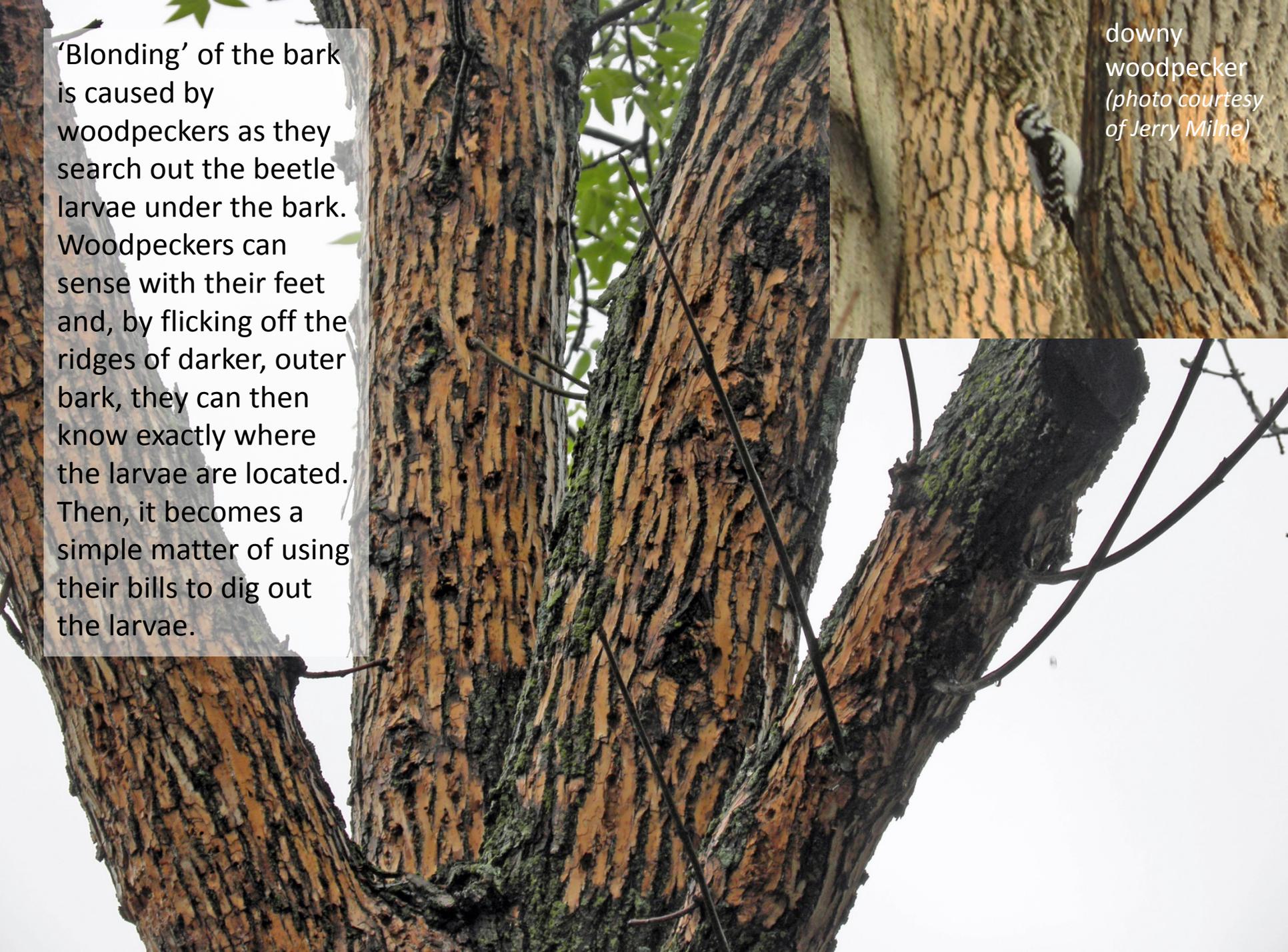
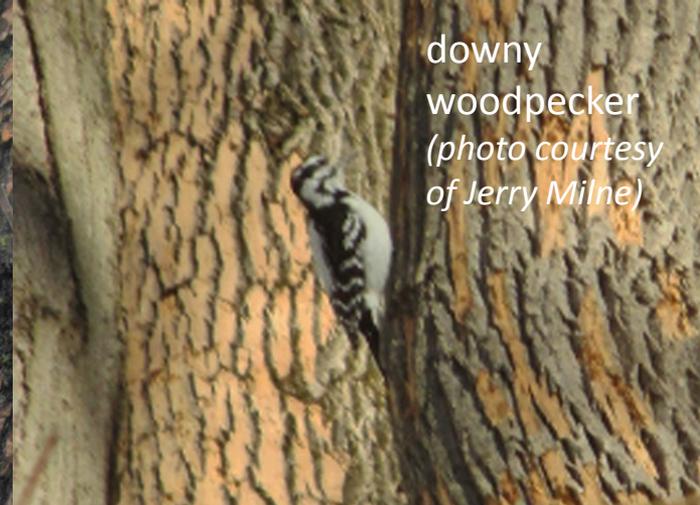




Epicormic sprouting is the tree's attempt to recover from the loss of leaves. The tree needs to grow new leaves if it is to have any chance of surviving. Of course, this is a gamble on the tree's part – too much sprouting and it uses up all of its reserves.

'Blonding' of the bark is caused by woodpeckers as they search out the beetle larvae under the bark. Woodpeckers can sense with their feet and, by flicking off the ridges of darker, outer bark, they can then know exactly where the larvae are located. Then, it becomes a simple matter of using their bills to dig out the larvae.

downy
woodpecker
*(photo courtesy
of Jerry Milne)*



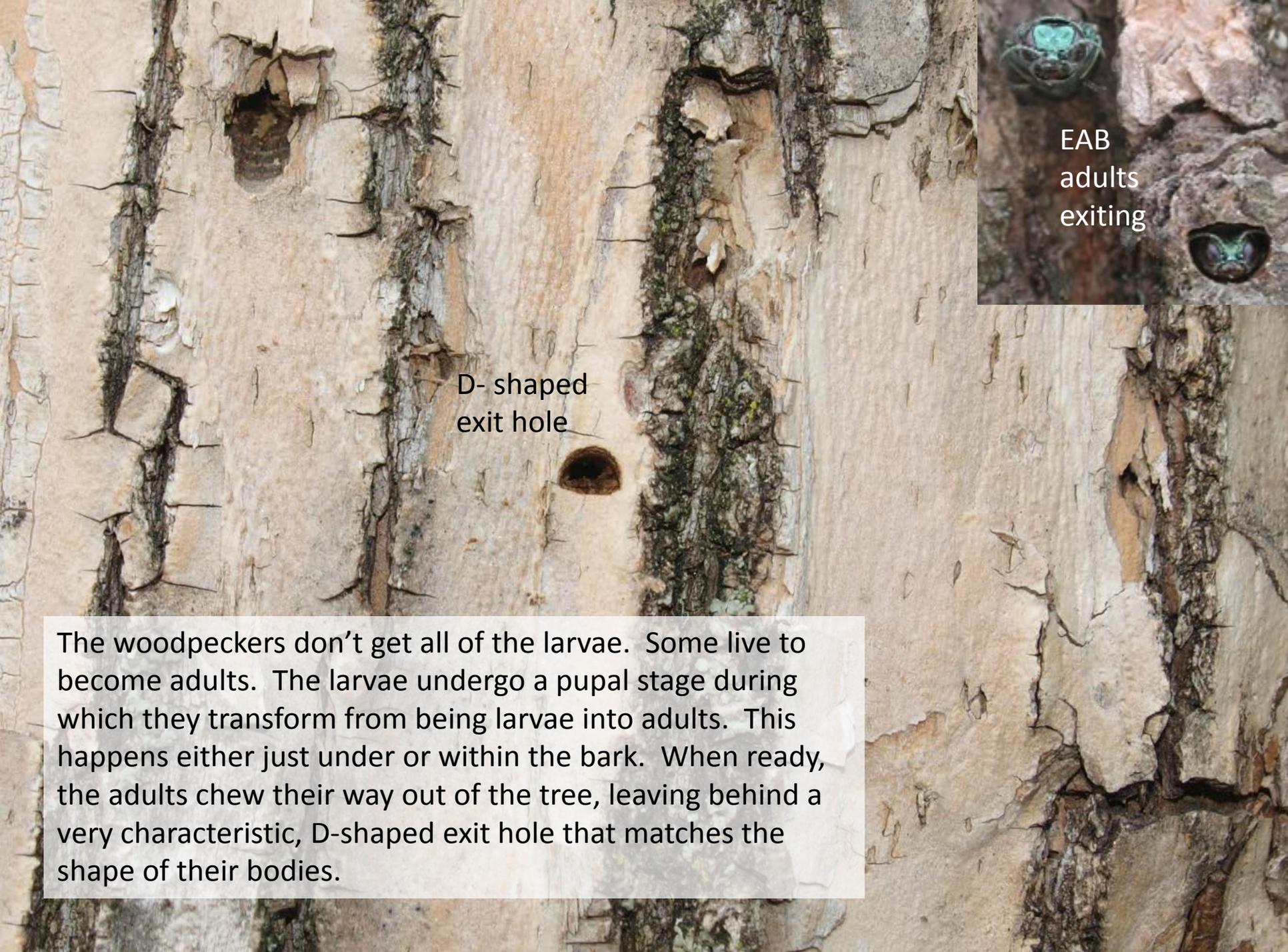
Here is another view of the woodpecker's activity and what results. The somewhat large, irregularly shaped hole is from the bird as it digs out an individual larva.



larva – not to scale



An even closer view of the bird pecks. Note that the holes do not go past the bark. The 'cambium layer', where the larvae lives, is between the bark and the wood of the tree.

A close-up photograph of tree bark with several vertical furrows. A prominent D-shaped exit hole is visible in the center-right. The bark is light brown and shows signs of weathering and insect activity.

D- shaped
exit hole

The woodpeckers don't get all of the larvae. Some live to become adults. The larvae undergo a pupal stage during which they transform from being larvae into adults. This happens either just under or within the bark. When ready, the adults chew their way out of the tree, leaving behind a very characteristic, D-shaped exit hole that matches the shape of their bodies.

An inset photograph showing two Emerald Ash Borer (EAB) adults emerging from a hole in the bark. The beetles are dark with a distinct greenish-blue sheen on their thorax and abdomen.

EAB
adults
exiting



While the D-shaped exit holes, the woodpecker activity and the epicormic sprouts taken together are all very good indicators of the presence of EAB, the best way to confirm that it is EAB is to go looking for them. Note – stripping the bark in this manner is very damaging to the tree and should only be done when it has already been decided to remove the tree.

Also note – a drawknife is much easier and safer to use for this purpose.

A close-up photograph of a tree trunk showing significant damage from Emerald Ash Borer (EAB) larvae. The bark is heavily peeling and cracked, revealing a network of 'S' shaped feeding galleries in the cambium layer. The wood is discolored and shows signs of decay. The background is slightly blurred, showing a paved road and some green foliage.

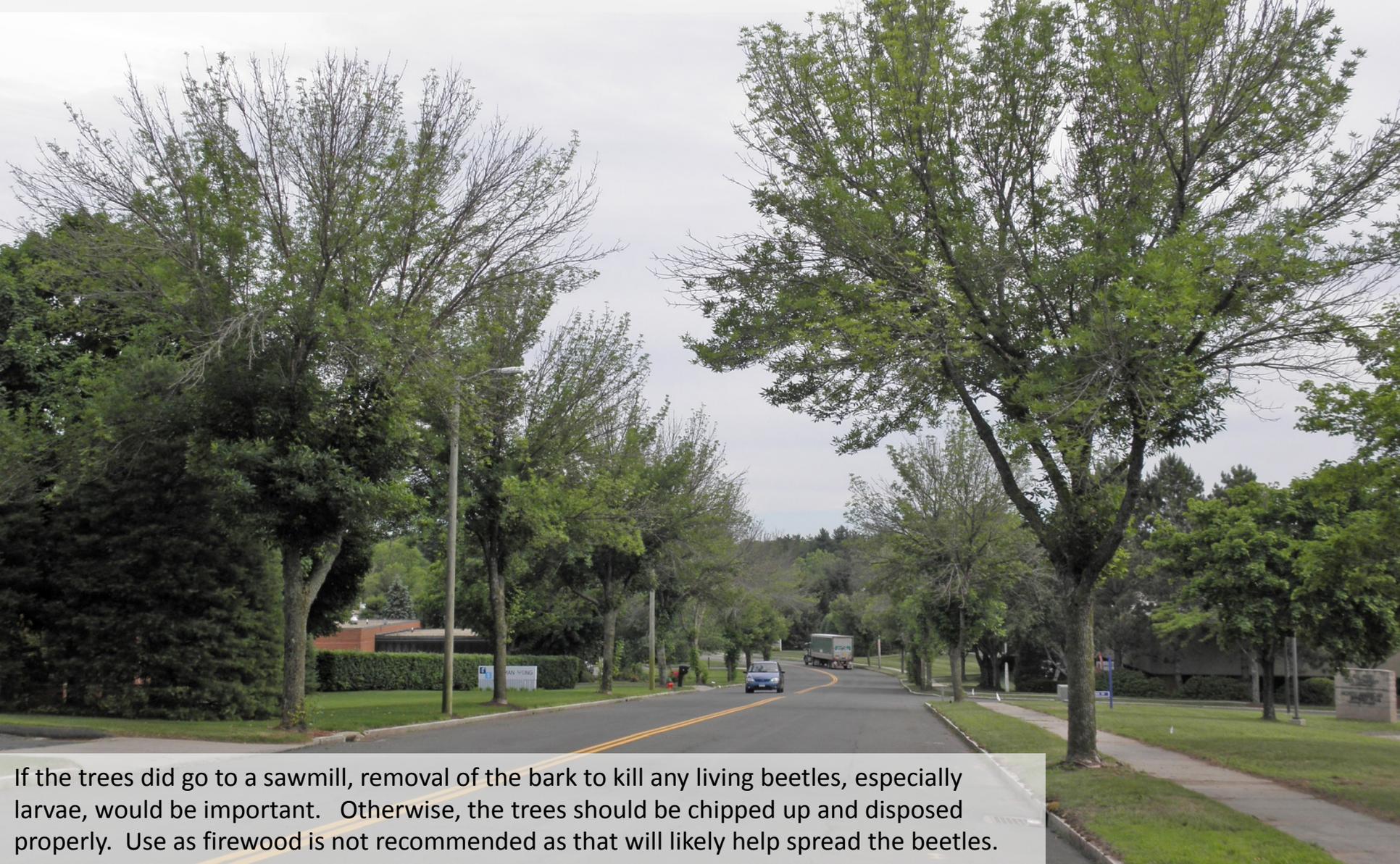
A better view of the cambium layer, where the EAB larvae live and feed. The cambium layer is between the bark and the wood of the tree. It is where the tree grows wood to the inside and bark to the outside. The scrolling tunnels visible here are the 'S' shaped feeding galleries of the EAB larvae. Galleries of this shape are another characteristic of this insect.

The darker areas surrounding some of the galleries are because those galleries are older and the bark and the wood around those galleries has died.



A larva discovered in one of the trees along Enterprise Drive. Note the serpentine, or 'S'-shaped, gallery that this insect was producing. The dark, powdery material is 'frass' that the larva is excreting as it moves along in its feeding gallery. When ready, this larva would have curled up within either the inner bark or just into the wood to pupate and then become an adult. Adults tend to start emerging in June.

As the City prepared for the removal of these 60 ash trees, consideration was given to the potential for commercial value in the wood. For that reason, the City contracted with a local tree service that also makes lumber.



If the trees did go to a sawmill, removal of the bark to kill any living beetles, especially larvae, would be important. Otherwise, the trees should be chipped up and disposed properly. Use as firewood is not recommended as that will likely help spread the beetles.



Before: this is how the street looked on June 17, 2015, before the removal of the trees had begun.

After: this is how the street looked on August 4, 2015, following the removal of the trees.



Lessons and Opportunities

- As attractive as this planting was, the outcome of this infestation shows the risk inherent with having a whole street lined on both sides with a single species. If there had been a mix of species, it is very likely fewer trees would have to be removed.
- Hindsight is always 20/20, but it is possible that these trees could have been saved if the street been identified as one with a high risk of EAB attack, and if the trees had been treated with an insecticide when EAB was first discovered in Connecticut.
- Of course, treating those trees would have added a cost burden to the City of Bristol. Treatments would need to occur over several years, on an ongoing basis, in order to be effective. A careful look at the economics of the situation would need to be done as well.
- Guidance on this type of decision-making is available. In particular, Purdue University's Emerald Ash Borer Cost Calculator (available on-line for free download) would have provided very helpful cost estimates. (<http://extension.entm.purdue.edu/treecomputer/>)
- All towns, and especially all towns that have not yet been effected by EAB, should know the location of their ash trees. A full inventory is helpful, but even limited knowledge of where and how many ash trees are in town would be very helpful for planning purposes.
- Once in a town, EAB tends to kill all of the ash in the town in an accelerating manner, with the majority of the trees dead within 4-5 years after the beetle is first noticed. If they want to save ash trees, tree wardens should make themselves aware of all significant individual ash trees and groups of ash trees, and begin to actively plan as to what to do when EAB arrives in town, as it will, in every town.
- Removal and disposal of dead trees once EAB hits will be a major cost. Plans as to what to do with the wood following removal are strongly recommended.

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For further information, please visit:

www.ct.gov/deep/eab

and

www.emeraldashborer.info

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