The Plant Doctor's LANDSCAPE TIPS

By David L. Roberts, Ph.D., *Senior Academic Specialist, College of Agriculture and Natural Resources, Michigan State University*

Photo 1: This large beech tree and several others in this Ludington landscape had been saved from destruction from Beech Bark Disease by Megan and Gary Kuhlman through Pointer applications using Arborsystems' Wedgle. All other beech trees in the vicinity have died of BBD or had been removed preemptively, before "beech snap" occurred.

BEECH BARK DISEASE: A MANAGEMENT BREAKTHROUGH?

INTRODUCTION:

Beech Bark Disease (BBD) is a lethal "disease" caused by an interaction between the introduced beech bark scale (BBS=Cryptococcus fagisuga), and several species of Nectria fungi, at least two of which were introduced into North America. A summary of the intricacies of BBD was published in the April issue of *The Landsculptor*.

When BBD was first detected in Michigan in the Ludington area in the early 2000's, scientists initiated research trials to try to manage the disease. These trials included sprays of insecticides and oils, scrubbing the bark, and high pressure power washes in attempts to dislodge the scale. According to my understanding of information from scientists who have worked on BBD locally and in other states, no practical and economical management methods have been developed, even though standard scale treatments should be reasonably effective. With the author's discovery of the Emerald Ash Borer in 2002, research on BBD was largely abandoned by scientists in Michigan. *See Sidebar-The Northern Michigan Tree Doctor.*

THEORY OF BBD MANAGEMENT:

Because extensive bark colonization of beech trees by high populations of BBS causes wounding of the trees, the injured areas serve as entry points for the Nectria fungi to invade trees. Infection and colonization of wood tissue by Nectria fungi ultimately results in catastrophic tree failure known as "beech snap", which simply means, structural failure of trees. With the potential for beech snap to result in liability concerns, property owners, arborists and foresters who manage landscapes, parks and campgrounds typically remove beech trees before they become liabilities.

Table 1. Beech Bark Disease Chemical Treatments*

Trade Name	Chemical Name	Supplier
Talus	Buprofezin	SePRO
Whippet	Phosphoric Acid	Banner/Arborsystems
Pointer	Imidacloprid	Banner/Arborsystems
Talus "Injectable"	Buprofezin	SePRO/Arborsystems

* Three Replicates per Treatment; Treatments applied July 2007

Photo 2: Five years after treatment, all Talus-treated trees remained free of beech bark scale (BBS) infestations- "smooth as a baby's bottom," as the saying goes.

Theoretically, the elimination of or minimization of BBS colonization on beech trees should prevent Nectria infections and subsequent "beech snap" and tree death. The primary goals of this research were aimed at preventing/minimizing/eliminating BBS infestations on beech trees.

RESEARCH DESIGN AND METHODS:

Research Design and Methods: Trees at a private landowner location were donated as the primary research site for this research near Ludington, Michigan; the tree population was comprised of mature, tall forest (landscape) trees, all of which were infested with various levels of BBS. The primary site contained sufficient numbers of trees for three replications per treatment in a completely randomized design. Chemical treatments utilized in this study are summarized in Table 1. Beech trees in landscapes in the Ludington area and elsewhere were also treated using various methods but represented real-world, arborists', albeit anecdotal, treatment observations only (Photo 1). Treatments included sprays of Talus (Sepro-Insect Growth Regulator) and injections of various insecticides and fungicides with Arborsystems' Wedgle Direct Injection system. Treatments at the primary site were applied only once in July 2007. Treatments at observational sites were applied once or sometimes twice in succeeding years. Management information was collected every year at all sites.

RESULTS:

The information collected from the primary research site five years after treatment is summarized in Table 2. The scale on some trees turned gray within a couple of months after treatment and was presumed to be a lethal reaction by the scale to the treatment. However, five years after treatment, trees sprayed with Talus stilled remained free of BBS (Photo 2). Trees injected with Pointer (Imidacloprid) largely remained free of BBS

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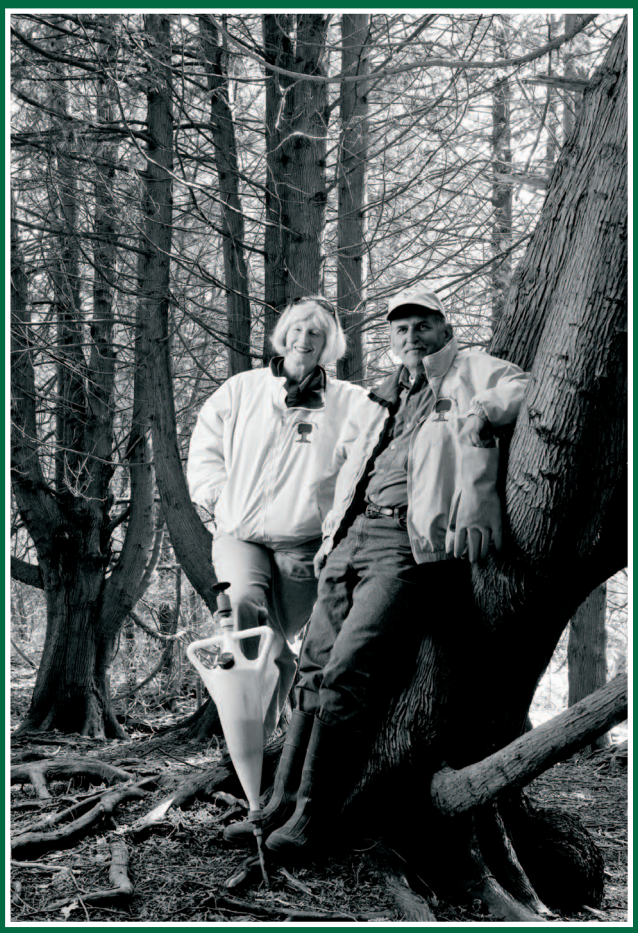
Table 2: Management of Beech Bark Disease 5 Years After Treatment*

Treatment #	Treatment Description	Result
1	Talus Spray	Excellent
2	Pointer	Excellent
3	Talus Inj + Whippet	Unacceptable
4	Pointer + Whippet	Unacceptable
5	Talus Spr+Inj+Whip	Unacceptable
6	Untreated Control	No Control

*Treatments applied in July 2007. Ratings taken in October 2012



THE NORTHERN MICHIGAN TREE DOCTOR:

(Dr.) Megan and Gary Kuhlman owned and operated a business known as The Northern Michigan Tree Doctor when Beech Bark Disease was discovered in the Ludington area in the late 1990's and early 2000's. They sought scientific information to incorporate into their tree healthcare protocols to respond to their clients' pleas for help in saving their beech trees from the lethality of BBD. Unfortunately, BBD research diminished with little development of practical management techniques when the Emerald Ash Borer became a prime focus after its discovery by the author in 2002. As innovators, Megan and Gary adopted some of the tools they had in their arborist arsenal and began their own field research. One technique they found to be particularly effective was injection of Pointer into trunks of beech trees using Arborsystems' Wedgle Direct Injector (Photo 1). It was the author's observation of their work that provided the impetus for further research initiated with their help in the summer of 2007. Having previously retired from education, Megan and Gary have recently retired from tree care (Spring, 2013); Daniel Schillinger, a MSU graduate and Certified Arborist, has taken over the business.
Photo Credit: *Traverse: Northern Michigan's Magazine; www.mynorth.com.*

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for 3–4 years but by the 5th year showed a very low population of scale re-infestation (Photo 3); presumably these very low populations of scales are not sufficient to predispose trees to infections by Nectria. The canopies of both the Talus-treated and Pointer-treated trees remained healthy and full–foliaged (Photo 4). Even though scale populations in some of the other treatments declined dramatically, the treatments that included "Injectable Talus" and Whippet were deemed unacceptable due to apparent phytotoxic reactions at the injection sites (Photos 5 & 6); the wounds created by these phytotoxic responses remained conspicuous five years after the treatments (Photo 6). No wounding was observed with Pointer alone, and it was a rare occasion to find a wedge check in Pointer-injected trees five years after treatment (Photo 7). Untreated control trees still maintained an increasing population of healthy scale (Photo 8); some limb and tree section death with minor beech snap was noted but was limited primarily to untreated trees. In summary, two treatments, the Talus spray and Pointer injections, were judged excellent because each treatment provided more than two years management.

DISCUSSION:

The excellent results reported herein were not anticipated by the author or cooperators. With these outstanding results (too good to be true?), it is believed the study should be repeated even though some arborists have adopted these treatment protocols for real-world landscape applications and have thus far been supportive of the results in this study. Because the primary study site contained very tall forest trees (>65–75 feet) with few lower branches, the Talus spray could only be applied about half way up the trunk. Perhaps some of the reason for the success with Talus is that the chemical was applied with such force and volume that scale populations were literally being blasted from the trunks of trees. However, Talus is not reported by SePro to be systemic according to the label; it is reported to move locally by vapors. In this study, Talus-treated trees remained free of scale to the very top branches and canopy for the past five years, suggesting, per-

Photo 3: Five years after treatment, Pointer-injected trees just began to be re-colonized with BBS, having been largely free of scale for the first 3-4 years after treatment. It is presumed that this low scale population may not be sufficient to predispose trees to serious Nectria infections.

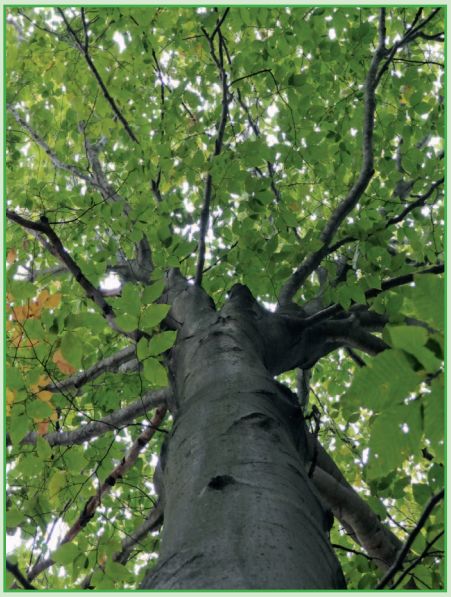

Photo 4: The canopies of trees treated with Talus and Pointer remained quite healthy and full-foliaged five years after treatment.

Photo 5: Upon treatment with Injectable Talus in July 2007, the material seemed to precipitate into a latex-like substance and dribbled out of injection sites.

haps, that Talus is systemic and possesses a long residual. Pointer-injected trees were also free of scale to the top canopy; however, Pointer is known to possess systemic properties. The Wedgle Direct Injector obviously has some advantages over the Talus spray by eliminating drift issues and keeping the insecticide within the tree rather than being widely distributed over the landscape environment. Trunk injections are useful in locations where (minor level drift) applications to non-target plants are not tolerated.

Forest managers and property owners often preemptively remove beech trees from public and private lands (ex. parks and campgrounds) to avoid liability issues associated with BBD and axillary beech tree failures. Because of the relatively slow progression of BBD and now with some possible treatment tools to further impede and perhaps even effectively manage BBD, there is a potential for new hope to maintain beech trees in their native habitat. Many foresters and scientists consider beech trees to be an important component of the forest ecosystem for wildlife, diversity and other important issues. With long treatment intervals of say 4–5 years, it may be economically feasible to maintain beech populations in some campgrounds, parks and woodlots. Updates on this research will be forthcoming as the study is being allowed to proceed with no interference other than collection of information.

Acknowledgements: The author would like to thank Megan and Gary Kuhlman for their contribution of application equipment and assistance, Dan Banks and Doug Fenner of Banner Sales, Inc., for their donation of materials and assistance, and Chip Doolittle, President and Owner of Arborsystems, Inc., for donation of materials.

For more information, please feel free to email David Roberts at robertsd@msu.edu or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.

Development of Landscape Tips was sponsored by MSU and MGIA.

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Photo 6: Whenever injection sites contained Injectable Talus or Whippet (a phosphorus-based fungicide), ugly scars remained five years later. It was later discovered that a chaser of water would prevent phytotoxicity from Whippet.

Photo 7: Injections of Pointer did not result in any visible damage at the time of injection or five years later. On very rare occasions, a wedge check could still be found.

Photo 8: Untreated control trees continued to maintain increasing populations of beech bark scale. Some limb and section death disclosed Nectria cankers, although major beech snap was not observed.