



The Plant Doctor's LANDSCAPE TIPS

By David L. Roberts, Ph.D., *The Plant Doctor LLC*

BEECH BARK DISEASE: 11 YEARS LATER



Photo 1: Beech trees are prized for various reasons. Although beech trees are considered by many to be “thin barked”, if you’ve ever cut through the bark, you’d find that they are rather thick-barked with a smooth surface.



Photo 2: Large beech trees in landscape areas are highly prized. This tree was kept alive by Gary and Megan Kuhlman in a landscape near Ludington with Wedgle/Pointer treatments long after most trees in the area had died.

INTRODUCTION

Beech trees are prized by many people for a variety of reasons (Photo 1). In 2007, when many scientists were engaged with research on the Emerald Ash Borer, Michigan’s beech trees and their owners felt very neglected. Beech Bark Disease (BBD), a lethal and invasive problem on beech trees, had been introduced into the Ludington, MI., area in the late 1990s. The disease was spreading very quickly, and many grand old landscape and forest beech trees had the potential to succumb to the malady (Photo 2). BBD is a collaborative relationship between the Beech Bark Scale (BBS) and several species of *Nectria* fungi. The “disease cycle” is summarized as follows: 1) BBS colonizes the bark of beech trees (Photo 3), 2) the piercing/sucking mouthparts of the BBS creates numerous tiny wounds, 3) *Nectria* fungi move into these wounds and develop cankers, and 4) the final



Photo 3: High BBS infestations such as in this example eventually lead to *Nectria* canker development.

stage of BBD is known as “Beech Snap,” when trees die and fail structurally (Photo 4). For more information on the biology of the disease, please see the April 2013 issue of *the Landsculptor*, ‘Beech Bark Disease.’

In 2007, a cooperative effort among the following people was enjoined to try to bring some relief for the suffering beech trees . . . and their owners: Megan and Gary Kuhlman, now retired but former owners of The Northern Tree Doctor, Dan Banks and Doug Fenner, Owners of Banner Sales and Consulting, and Chip Doolittle, CEO & owner of Arborsystems, Inc.

MATERIAL AND METHODS: “THE HAIL MARY PASS”

In football, the losing team may throw a “Hail Mary Pass” in the final seconds of the game, as a last-ditch attempt to wrest the lead from the opposing team. Sometimes it works and sometimes it doesn’t. In the case of BBD, not many funds were available for extensive research. So, the cooperators elected to establish some replicated treatments in both a landscape area and a wooded area near Ludington,

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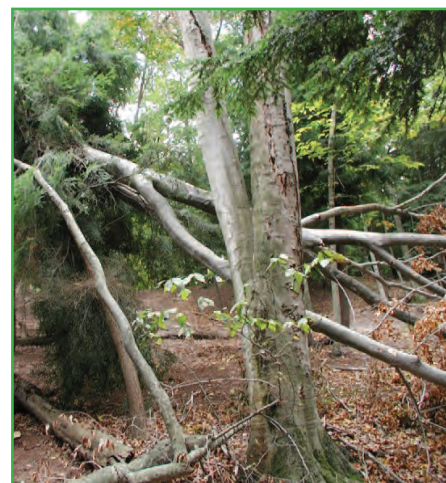


Photo 4: *Nectria* cankers eventually lead to “beech snap” and tree death.



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Michigan. The treatments are summarized in Table 1. The plan was to perform the treatments only once in July 2007 and then let the experiment run, with no retreatments. This style of experimentation may be described in science as “quick and dirty” or in the real world as “The Hail Mary Pass.”

Table 1: Beech Bark Disease Treatments*

July 17, 2007

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

*Two Locations; Three Replicates per Treatment; Treatments applied July 2007



Photo 5: Here, Gary Kuhlman has applied a strong firehose-like application of Talus to this forest tree. The spray blasted the scale from the tree, even though the spray could only reach about half way up the trunks of these large forest trees.

All trunk injections were performed with Arborsystems' Wedgle by Dan Banks. Tree sprays with Talus, an insect growth regulator reported to be particularly effective against scale insects, were performed by Gary Kuhlman (Photo 5). I, Dr. Roberts, served as “Head Supervisor”. It should be noted that the tree sprays were essentially trunk sprays because all treated trees were so tall that no lower branches or foliage could be reached with the sprays (Photos 2 & 5). It should also be noted that the trunk sprays were put on with great force and volume (remember the “Hail Mary pass” – we wanted the best chance of success with what might be regarded by some as “overtreatment”), literally blasting the scale from the bark of the tree (Photo 5). The volume of spray material often collected at the base of the tree in what might be described as a “drench”. Because of the size of the trees, the sprays could only reach about half way up the trunks. All trees in this study exhibited scale infestations, although at somewhat varied population levels.

Observations, notes and photographs were taken at the time of treatment, later in 2007 and in most years after 2007.

RESULTS

Our first observations within a couple of months after treatment in 2007 disclosed some interesting information. The trunk injections using Talus Injectable or Whippet were immediately deemed unacceptable because of the large wounds that developed at the injection sites (Photo 6A). These wounds remained quite visible for the next 11 years (Photos 6A, 6B & 6C) even though by 2018, they had healed over nicely (Photo 6C). While it might be concluded that the Wedgle injection system was responsible for these wounds, that was apparently not the case. Wherever imidacloprid (Pointer) was injected by Wedgle,



Photo 6A: In this photo, this beech tree was treated with “Injectable Talus” formulated by Chip Doolittle at Arborsystems, Inc. Unfortunately, this formulation turned to a “flowable latex” upon injection. These injection sites also left large welts in the bark of the trees. Note the dribbling stream of injectable Talus from the injection sites. Oh well, back to the drawing board for Chip to work his formulation magic.



Photo 6B: Five years after injection with Whippet or Injectable Talus, large sores remained.



Photo 6C: Eleven years after injection with Whippet or Injectable Talus, the sores had largely healed over.



Photo 7: Whenever Pointer was used in the Wedge Direct Injection system, there was no evidence of damage whatsoever to the bark of the trees. This photo was taken 5 years after injection. A couple wedge checks could even be found “floating” on the bark 11 years after injection.



Photo 8: In 2012, all Talus-treated trees were scale free five years after treatment. This photo was taken in 2015 of a Talus-treated beech tree, showing promise of control of BBS even eight years after treatment.

there were no visible signs of trunk injury whatsoever (Photo 7). Hence, it appeared that chemical components (or carriers) in both Whippet and Talus injectable were phytotoxic to plant tissue at the injection sites. With the Imidacloprid treatments, wedge checks could still be found 5 years after treatment (Photo 7); a couple wedge checks were even found “floating” on the bark 11 years after treatment (but no damage was apparent).

Five Years: The first results of this trial were published in 2013 (See June 2013 issue of *the Landsculptor*, ‘Beech Bark Disease: A Management Breakthrough?’) five years after the treatments were initially administered in July 2007. At that time, we were enthralled with the success of two treatments (see Table 2), Talus sprays and trunk injections with Pointer, which seemed to provide protection for five years from one treatment in 2007. The trunk injections with Talus Injectable and Whippet still exhibited large welts at the injection sites (Photo 6B) five years after treatment. The Talus-treated trees were completely bare of scale infestations five years after treatment (Photo 8). The Imidacloprid (Pointer) treated trees were largely free of scale infestations as well . . . except that a very small population (very sparse) of scale was reestablishing themselves on the bark. All untreated control trees possessed high populations of scale, but no significant beech snap was observed five years after the study had been initiated (Photo 9). Because of concern for beech snap, which was widespread in the Ludington area, the owners of the landscape site had all of their beech trees removed. The forest location remained intact.

11 Years: The two treatments that exhibited the best control 5 years after treatment also exhibited the best control 11 years after treatment. With some replicates, BBS was starting to recolonize

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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	Exc/Very Good
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



Photo 9: On untreated control trees, the scale populations continued to increase year after year. By 2012, the populations on these trees were significant but no major “beech snap” was observed.



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the trees (Photo 10). Although the wounds created by the Talus Injectable and Whippet were still visible, they were healing over very nicely 11 years after treatment (Photo 6C). All treated trees in the study exhibited full, healthy canopies (Photo 11). All untreated control trees by year 11



Photo 10: By year 11, scale populations started appearing in higher populations on Talus and Pointer trees. Note the dark objects, which are tiny beetles and larvae feeding on the scale insects (also see Photos 13A & 13B).



Photo 11: Regardless of the treatment used in this study (except for untreated control trees), all trees exhibited full, vibrant canopies, even into year 11.



Photo 12: By year 11, all untreated control trees had succumbed to beech snap from the high, unchecked scale populations followed by infection by Nectria fungi.

after the initiation of the study in 2007 had succumbed to beech snap (Photo 12).

Biological Control: During my visit to assess the study in August, 2018, small beetles and their larvae were noted on trees with scale infestations (Photos 10, 13A & 13B). The adults were busy scurrying around, as though they were chasing after something. Likely, they were chasing and feeding on the small crawlers of BBS. It is unlikely the beetle populations can keep up with the scale exponential increases in populations, but the activity was a joy to watch.

DISCUSSION

The primary theory to managing the BBD complex is to keep scale populations very low or nonexistent. Low or no scale populations should inhibit attack by the deadly Nectria fungi, which eventually kill the trees and initiate beech snap. We were surprised at the level of control achieved and the longevity of the inhibitions of scale populations in this study by the Talus treatments and Pointer (imidacloprid) trunk injections. In my estimation, the Talus must be systemic, even though the manufacturers do not advertise this characteristic. When the treatments of Talus were applied in 2007, the spray application could only reach about half way up the trunks of these large trees (Photo 2). Yet, the scale populations were cleaned out over the entire tree. The Pointer trunk injections seemed to perform similarly. I am not aware whether beech trees tend to root-graft with one another, but it is possible that treated trees within root graft range might have been sharing the chemical treatments (there was no evidence of this phenomenon with the untreated controls because they were generally located greater distances

from treated trees to prevent spray drift, etc.). In other words, trees treated with trunk injected imidacloprid might also have received some Talus through root grafts, and vice versa. Several arborists in the BBD-infested areas of northern Michigan have adopted the Talus sprays and/or imidacloprid injections into their programs. Some of arborists claim mixed results with these treatments. Gary and Megan Kuhlman immediately assumed a treatment protocol for some of their customers and witnessed rather dramatic results (Photo 14). Based upon the results we obtained in this study, I think that it might be possible to obtain at least 8-10 years of reasonable control of BBD with one treatment. Hail Mary! 🍀

Dr. David Roberts has retired from Michigan State University but intends to remain active with the industry. He is CEO and CBW (Chief Bottle Washer) for The Plant Doctor, LLC. His contact information remains the same: 248/320-7124 & robertsd@msu.edu.



Photo 14: Gary & Megan Kuhlman adopted the Talus treatments into their regimen of business practices soon after initiation of our study in Ludington in 2007 (They had already been using Pointer/Injections with good success). At this site near Leland, MI., several beech trees to the right of the tree in this photo had been treated with Talus spray the previous summer. Note that a slight spray drift from the nearby treated trees had destroyed the scale population on the right side of the trunk of this tree in the photo. Hail Mary!

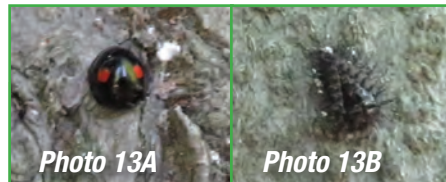


Photo 13A

Photo 13B

Photo 13A & 13B: An adult beetle (A) and immature (B) were witnessed in the midst of scale infestations (see Photo 9) apparently feeding on the scale crawlers. The adults were sometimes scurrying around as if chasing their prey.