

Mud Packing:

A SIMPLE METHOD FOR THE PRESERVATION OF BLIGHT-SUSCEPTIBLE AMERICAN CHESTNUT

By Erik Carlson, Research Project Assistant and Vernon Coffey, Research Support Specialist, State University of New York College of Environmental Science and Forestry (SUNY-ESF), Syracuse NY

In the effort to restore the American chestnut, three main techniques have taken precedence: biotechnology, breeding, and biocontrol (the 3BUR approach). While biotechnology and breeding focus on the production of new resistant trees, biocontrols are methods of directly treating the effects of blight infection on susceptible trees.

The future of the American chestnut will focus on the production of resistant trees, but in the meantime, non-resistant wild type American trees must be maintained in order to produce pollinated crosses. These trees are susceptible to blight and will eventually become infected and suffer from cankers. In order to keep these trees healthy enough to grow to sufficient size to produce flowers and nuts, the effects of blight need to be minimized as much as possible. At SUNY-ESF, we are employing this technique to help maintain mature wild-type “mother” trees for crossing with the ‘Darling’ blight-tolerant American chestnut trees. This outcrossing is important to build a genetically diverse and regionally adapted restoration population.

Mud packing, aka soil compress, is a simple biocontrol technique first described by Weidlich in the Proceedings of the International Chestnut Symposium in 1978¹ that takes advantage of a familiar phenomenon: the chestnut’s ability to survive underground. Although blight is capable of killing American chestnuts above ground, the tree has the ability to produce new sprouts from the stump. This is possible because the blight is unable

to kill the roots and underground portions of the tree. The parts of the tree that are beneath the soil are protected from the pathogen by the teeming diversity of natural soil microbiota. The pathogen is unable to compete with the overwhelming presence of microbes or possibly particular antagonistic microbes. Mud packing takes advantage of this mechanism and raises the soil to places on the tree where blight has taken hold in order to mitigate the infection. More background information on mud packing can be found here: <http://bit.ly/2MUgkT1>.

How to mud pack

When a blight infection on a stem is discovered, it’s better to act sooner rather than later in order to minimize damage to the tree. That said, even large cankers can be treated with this method. A description of mud packing can be found at this link: <http://bit.ly/2Th4gwk>. Below is the method we use with slight modifications.

First, the surface of the canker should be removed with a sharp tool. A variety of tools can be used to accomplish this such as a utility knife or a draw knife. The tissue beneath the bark that is affected looks very different from healthy

Wild American chestnut discovered by Erik Carlson in upstate NY. Photo by Erik Carlson.

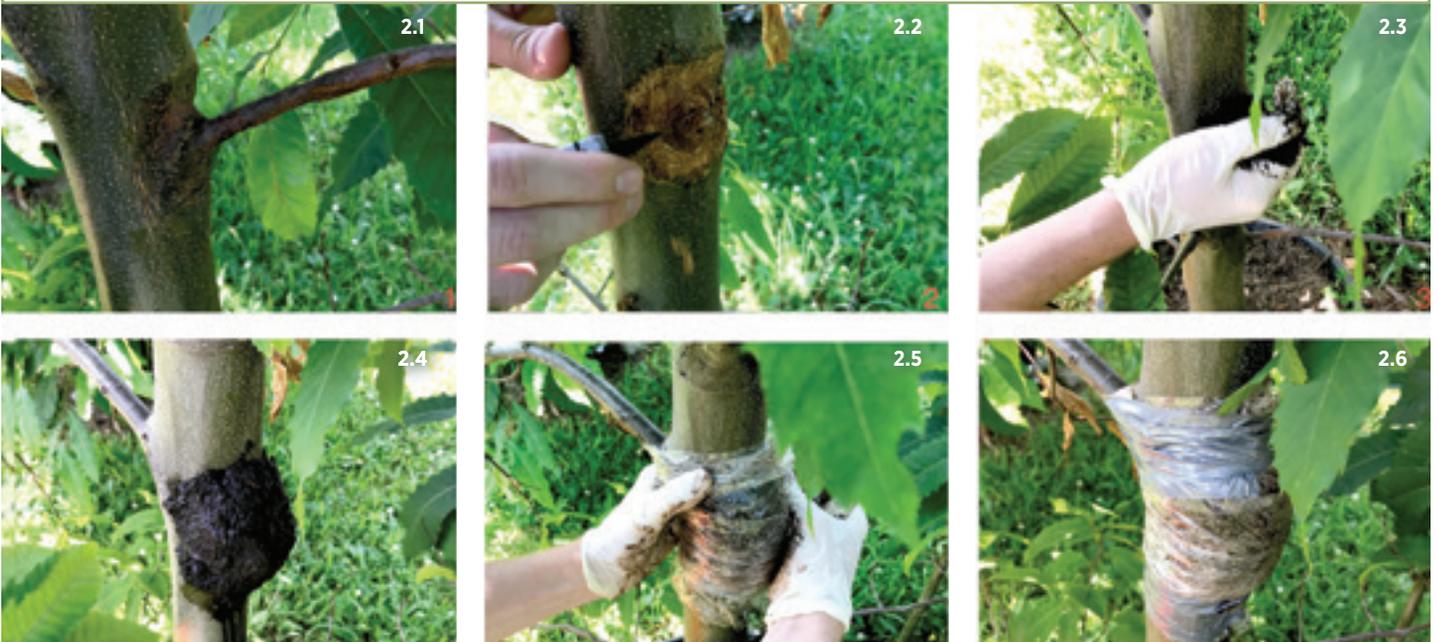
¹W. Weidlich, Proc. Int. Chestnut Symposium 1978. MUDPACK FOR CHESTNUT BLIGHT DISEASE CONTROL. A Preliminary Report on a Method of Biological Control of the Chestnut Blight Not Involving the Use of a Hypovirulent Strain of *Endothia parasitica*.

Figure 1

A large untreated canker, April 2018 (left); the same canker after carving off blighted tissue (center); healed canker after one growing season, October 2018 (right).

**Figure 2**

A severe sunken canker originating from branch; Fig 2.2 Branch is removed and surface tissue removed with utility knife; Fig 2.3 Mud is pressed tightly on carved out canker; Fig 2.4 Mud pack covers wound; Fig 2.5 Plastic is wrapped tightly around mud pack compressing soil into wound; Fig 2.6 Plastic is sealed and secured with tape on top and bottom.



tissue; the border between a canker and healthy tissue beneath the bark is a clear demarcation of brown (dead) tissue to green (healthy) tissue. The removal of this outer layer will expose the blight fungi within the stem tissue to the microbes in the soil. If the outer layer of bark is not removed, there will be a chunk of dead rotting tissue stuck in the tree when you remove the mud pack.

Once the outer surface is removed, moistened soil should be pushed into the wound firmly. The soil should be very wet, as its liquidity will help fill every nook and cranny the blight is

hiding in. The source of the soil can vary but most sources should contain a large quantity of living microbes.

After the mud is packed into the hollowed canker, it needs to be sealed in. To do this, plastic is wrapped around tightly to compress the mud into the wound. A number of different items can be used for the plastic source, such as plastic bags or plastic shrink wrap. The bottom and top of the plastic-wrapped pack are then sealed with tape. It's important to use tape or something stretchable; plastic zip ties can cut into the stem of the tree as it grows. Mud packs

are typically left on the trees over the course of a growing season, with cankers being inspected in the fall.

At SUNY-ESF, we have had a high success rate using this technique. In Weidlich's original report in 1978, he accomplished nearly 100% success rate in healing cankers with his mud packs, and in our limited usage we have seen similar results. I hope this article will encourage others to implement this technique in their orchards to help preserve their invaluable American chestnut mother trees.