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The Myth of Cloroxed Clippers

"A bleach solution is the best choice for disinfecting pruning wounds and tools"

The Myth

Anyone who has made an investment in top-quality pruning tools probably cleans and maintains them on a regular basis. But would you clean them every day - maybe several times? If you are worried about potentially transmitting plant diseases such as fire blight, Dutch elm disease, and sudden oak death, then such a cleaning regimen would be crucial. Furthermore, you might be inspired to disinfect the pruning wounds, especially those made on diseased trees and shrubs. The question is – what to use as your disinfectant?

Nearly all of the popular web sites with advice regarding tool disinfection say something like this: "…sterilize pruning tools using a solution of 1½ cups of liquid chlorine bleach in 2 gallons of water. After each cut, dip the pruner or saw into this solution before starting the next cut." This advice is repeated on thousands of web pages, including .edu sites. Is this the best choice?

The Reality

A few years ago I wrote a fact sheet on when to disinfect pruning tools (available on my web page at http://www.puyallup.wsu.edu/~Linda%20Chalker-Scott/Fact%20sheets.html), so I will not cover that material for this discussion. We'll assume you have already established a legitimate need to disinfect your tools and focus on choice of disinfectant materials.

Before disinfection, tools should be free of dirt and debris so the disinfecting solution can reach every cutting surface. Increment borers should be treated in the same manner. Disinfectant solution can be carried into the field in a tightly sealed plastic bottle; ideally this bottle should be wide enough so that tools can be dipped directly into it. If this is not feasible, solution can be applied with a clean cloth or poured over the tool held over a bucket. Disinfecting solutions should not be allowed to contaminate the soil.

Pruning tools that are regularly disinfected need to be kept in top condition. The older the blades, the more pitted they become; these pits can harbor microbes that are unaffected by quick sterilization. This is especially true of bacteria associated with active cankers; the sticky matrix is often difficult to remove from pruner surfaces. One study found that disinfectant solutions would not remove bacterial slime from the surface of cutting tools, especially if the tool surface was pitted.

I do not recommend the use of chlorine bleach for disinfectant use in the field for a variety of scientific and practical reasons:

1) Tool damage: As the MSDS (material safety data sheet) states for Clorox as well as other brands of bleach, "prolonged contact with metal may cause pitting or discoloration." Indeed, this includes your pruning tools. Bleach is an oxidizing agent, which means it is corrosive. You don't find bleach for sale in unlined metal containers, and there's a reason for that.
2) Clothing damage: It's pretty self-evident that bleach will, well, bleach your clothing. Any spills in the field are impossible to treat unless you can immerse the affected material immediately. It probably is not a smart idea to carry a bottle of bleach in your pocket. Cloths used to wipe your tools down after treatment disintegrate quickly and have to be replaced continuously.

3) Human health damage: Chlorine bleach (like Clorox) is listed as an acute and chronic health hazard. In addition to the damage it can do to your clothing and tools, contact with bleach will irritate your skin and your nose, throat and lungs if vapors are inhaled. Medical conditions such as asthma, chronic bronchitis and obstructive lung disease are aggravated by exposure to chlorine bleach. Though you would most likely be in a well-ventilated area while using bleach, to minimize health risk you are also supposed to wear impervious gloves and safety glasses. This means more equipment to carry.
4) Plant health damage: Bleach is extremely phytotoxic, more so than any of the other commonly used disinfectants. Any bleach left on your pruning tools will damage the tissue of the next cut. Likewise, those pruners sold with reservoirs that release disinfectant as they cut should never be used.

Other disinfectant treatments have included**:**

Alcohol dips (ethanol or isopropyl alcohol): Alcohols are readily available and moderately safe and effective to use. They can be expensive, however.

Alcohol dips + flaming: Though this is standard procedure for tissue culture, it's not practical for field use.

Copper compounds (copper oxide, Bordeaux mixture): These are powerful fungicides and readily available. However, they probably are not the most environmentally friendly choice. There has not been a great deal of research on their effectiveness as pruning tool disinfectants.

Formalin (HCHO): It's used in embalming fluid and readily penetrates skin. Not a good choice.

Household cleaners (Listerine, Lysol, Pine-Sol): Readily available, moderately safe, can be extremely effective. Lysol (the original, phenol-based material) in particular was found to be least corrosive to pruning tools. This is my personal choice.

Trisodium phosphate (Na_3PO_4): Like bleach, this compound is corrosive and probably not a good choice for field work.

Finally, disinfectants should never be applied to pruning wounds, though old literature from the 1930's and 1940's often recommended this practice. This just adds insult to injury, making it more difficult for the plant to treat the wound with its own arsenal of disinfectants. Indeed, more recent research has established that pruning wounds treated with ethanol and other disinfectants had more cambial necrosis and wood discoloration than tissues left alone. Furthermore, treated wounds were inhibited from forming the callus tissue that protects damaged tissue. The only exception to this may be in treating cut stumps where regrowth is desired; in such cases sterilizing this broad, flat surface may prevent pathogen infection.

The Bottom Line

- Choose a disinfectant that is effective, readily available and affordable, relatively safe to handle, and won't harm your tools or clothing. Many household cleaners fit this description.
- Be sure to clean tools of dirt, debris, etc. before disinfecting.
- After dipping your pruning tools, be sure to wipe away excess disinfectant to avoid injuring the next plant.
- A longer soaking may be needed for pruning surfaces that are not smooth.

- Like pruners, increment borers should always be sterilized before and after use.
- Never use disinfectants on pruning wounds; they are phytotoxic and cause more harm than good.

For more information, please visit Dr. Chalker-Scott's web page at http://www.theinformedgardener.com.