

# Citrus stumps sprout control

**By Stephen Futch  
and Shawron Weingarten**

**F**lorida citrus growers have historically lost between 3 percent and 4 percent of their trees on an annual basis due to various pests, diseases and environmental factors. Since 2006, numerous citrus growers have been combating citrus greening (Huanglongbing, HLB) with tree removal to reduce inoculum levels within their groves. When combining historical

tree losses and those removed due to HLB, tree loss rates have dramatically increased in recent years.

Removal and replacement of declining trees is essential to maximizing long-term productivity of the grove. After shearing the tree for tree removal, the remaining stump is treated with systemic herbicide in an attempt to kill the stump and prevent sprout formation. Recommended products for control of citrus sprouts have recently been limited to various

formulations of glyphosate. Additionally, glyphosate warnings note the potential for the herbicide to translocate to adjacent trees via root grafting.

Today's prevailing tree removal method is by "shearing" or "clipping" the tree off above the soil line as compared to pushing the entire tree and majority of the root system completely out of the ground. Clipping as a tree removal method leaves the entire root system undisturbed and intact in the soil. Additionally, the control of vegetative regrowth or sprouts from the remaining stump or root system is important to the growth of the replanted tree. If the citrus tree was positive for HLB at the time of tree removal, sprouts developing from these remaining citrus tree stumps have been shown to be a significant source of HLB inoculum.

The objectives of our studies were to determine the appropriate rates of Remedy Ultra (triclopyr) to apply to citrus stumps and if delaying herbicide application would have an impact on subsequent sprout development. To

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assess the effectiveness of Remedy Ultra, two studies have been conducted during 2008-2010 to determine appropriate rates and timing of applications to control citrus stump sprouting. The first study examined various application rates (25 percent, 50 percent and 75 percent Remedy mixed with diesel) consisting of 15 replications per treatment. The second study looked at the impact of delaying application of the herbicide on the control of sprout formation and utilized seven replications per treatment.

Studies were conducted using a randomized complete block design in groves near Lake Placid, a typical ridge site, and Arcadia, a typical flatwoods site. Stumps were treated with a spray volume that consisted of approximately 1 to 2 fluid ounces of spray mixture per stump applied with a compression pump sprayer. Larger stumps received more spray volume than smaller ones. Efforts were made to direct the spray to the outer stump area to completely wet the cambium area and minimize any runoff of spray to the nearby soil surface. In all studies, observations were made on 30-day intervals over an eight-month period after clipping or shearing the tree as



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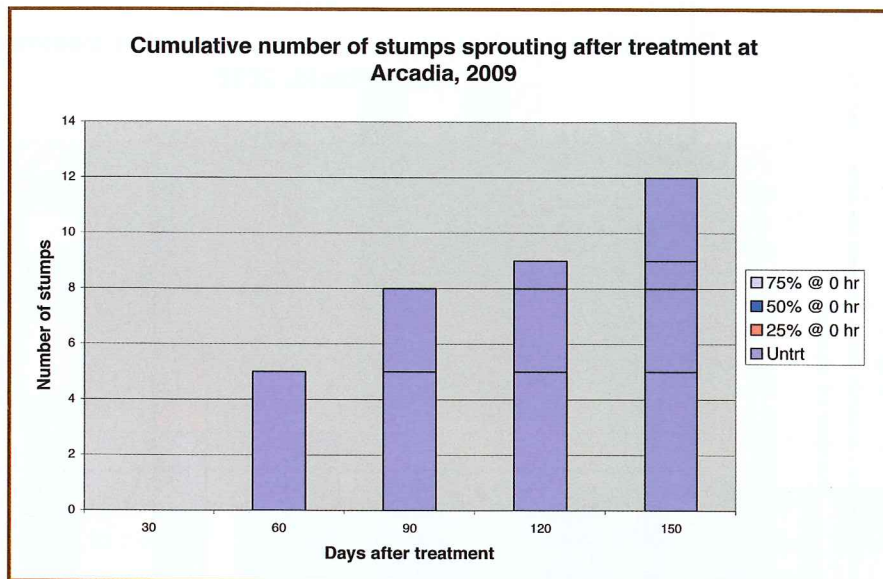
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the removal method.

During the first year of the study, 12 of the 15 (80 percent) untreated stumps sprouted (Figure 1). Sprouts were noted over the study period with 0, 5, 3, 1 and 3 of the 15 stumps sprouting at 29, 56, 85, 113 and 141 days after tree removal, respectively. The number of sprouts per untreated stump ranged from 2 to 26 and averaged 8 per stump at the end of the study. All treated stumps, regardless of the treatment rate, remained sprout free during the study period.

During the second year, studies were conducted at Lake Placid and



**Figure 1.** Cumulative number of stumps sprouting at Arcadia during the first year of the study. Treatments consisted of untreated control, Remedy at 25, 50 or 75 percent mixed with diesel and applied after clipping. One to two ounces of spray solution was applied to each selected stump to treat the stump and minimize runoff to the soil surface.

Arcadia. Treatments of Remedy Ultra were applied in a 25 percent or 50 percent solution mixed with diesel fuel at time of clipping, 24, 48 and 72

hours later. At the Lake Placid site, 2, 2, 1, 1 and 1 of the 7 (100 percent) untreated stumps sprouted at 30, 60, 90, 120 and 180 days after tree removal,

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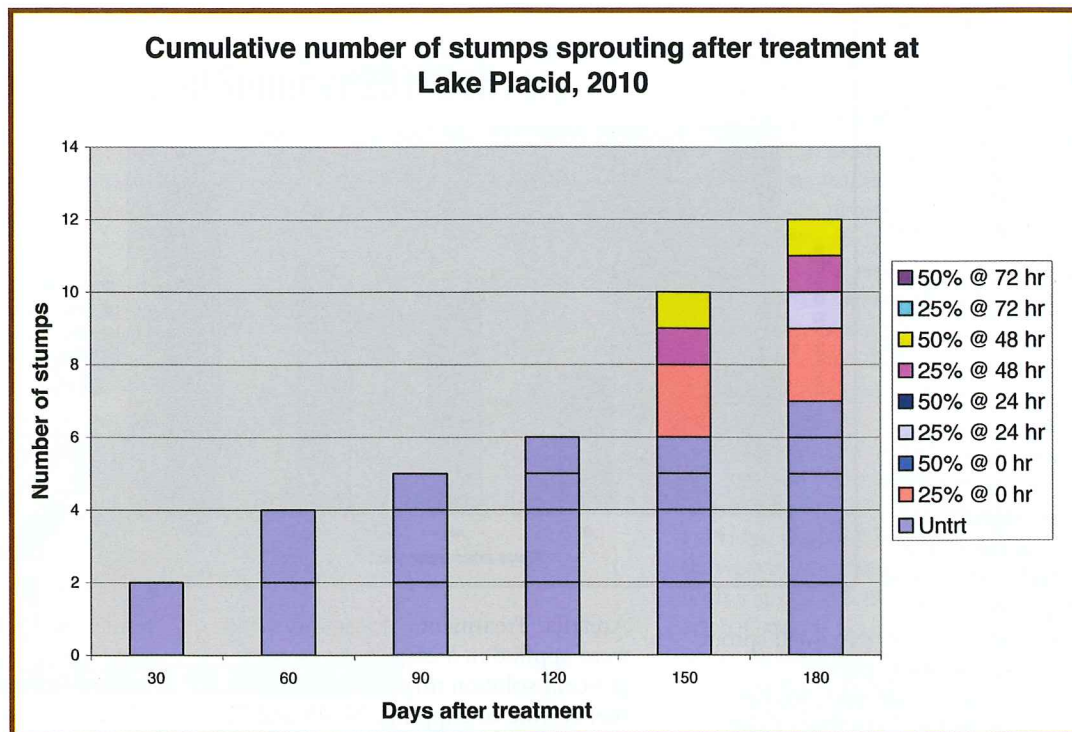
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**Figure 2.** Cumulative number of stumps sprouting after treatment at Lake Placid. Treatments consisted of an untreated control and Remedy Ultra at 25 and 50 percent solution mixed with diesel and applied at time of clipping (0 hrs.), 24, 48 or 72 hours after clipping.



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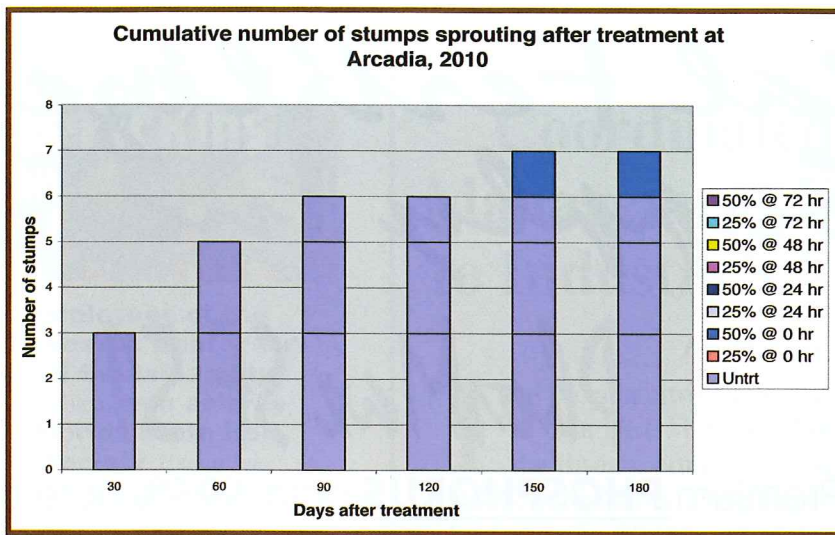
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respectively (Figure 2). At this site, five stumps within the 56 treated stumps had root sprouts, but not on the treated stump. All of the root sprouts occurred on trees originally grown on rough lemon rootstock, whereas none of the other rootstocks sprouted at this site. Remedy Ultra was slightly less effective in controlling sprouts when applied at the 25 percent Remedy/75 percent diesel than at the 50 percent rate, especially on rough lemon stumps. Delaying application using the lower rate also had a slight negative impact on sprout control.

At the Arcadia site, five of the seven untreated stumps sprouted at 60 days after removal with one additional stump sprouting by 90 days. At this site, 86 percent of the untreated stumps sprouted within 90 days of clipping (Figure 3). In addition to the untreated stumps, one additional stump developed sprouts which had been treated with a 50 percent spray solution at time of clipping. Only one stump exhibited root sprouts which occurred within 60 days after treatment regardless of the time of application of the herbicide. The number of sprouts per untreated stump ranged from one to eight.

In this experiment, rootstock and trunk diameter had an impact on root and/or stump sprouting. Trees with larger trunk diameter support greater incidence of sprouting compared to smaller trunks. Additionally, it has been previously reported that rootstocks, such as rough lemon and



**Figure 3.** Cumulative number of stumps sprouting after treatment at Arcadia. Treatments consisted of an untreated control, Remedy Ultra at 25 percent or 50 percent mixed with diesel and applied at time of clipping (0 hrs.), 24, 48 or 72 hours after clipping.

Cleopatra mandarin, are more prone to sprouting than other rootstocks like sour orange.

In some cases, growers have experienced sprout formation from herbicide treated stumps. It is theorized that this sprouting could be a result of:

- 1) incomplete coverage of the stump with the herbicide solution;
- 2) rain/irrigation on the recently treated stump that could dilute or wash off the treatment, and/or
- 3) breakage of the root system during the shearing or clipping process that would minimize the translocation of the herbicide material throughout the lateral roots.

Historically, some herbicides used for stump treatment have caused injury to adjacent healthy trees by translocation of materials via root grafting to the healthy trees. Resets planted near-by treated citrus stumps were damaged when excessive materials were applied to the soil surface or moved off the treated stump by rain or irrigation. In these studies with Remedy Ultra, no problems were associated with damaging adjacent trees.

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## Citrus black spot page is on the Web

A citrus black spot Web page is available on the Citrus Research and Education Center Web site ([www.crec.ifas.ufl.edu](http://www.crec.ifas.ufl.edu)). The page is located under the Extension section. Topic categories include history, symptoms, regulations, spread, diagnostics and management.

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