

Questions and Answers – Draft Environmental Impact Statement and Preliminary Pest Risk Assessment for Permit for Environmental Release of Genetically Engineered *Citrus Tristeza Virus*

What is citrus greening disease?

Citrus greening disease (caused by the bacteria *Candidatus Liberibacter asiaticus*) is one of the most devastating citrus plant diseases in the world. It is also known as Huanglongbing (HLB) or yellow dragon disease. Once a tree is infected, there is no cure. While the disease poses no threat to humans or animals, it has devastated millions of acres of citrus crops in the United States and abroad. Infected trees produce fruits that are green, misshapen and bitter, unsuitable for sale as fresh fruit or for juice. Most infected trees die within a few years.

Citrus greening disease was first reported to have occurred in Asia during the late 1800s and the disease has already caused devastation in Asia, Africa, the Arabian Peninsula and Brazil. The disease has now killed millions of citrus plants in the southeastern United States and is threatening to spread across the entire country.

How is citrus greening spread?

Citrus greening disease is spread by an insect, the Asian citrus psyllid (*Diaphorina citri* Kuwayama or ACP). These insects carry the HLB bacteria from tree to tree as they feed on the leaves and stems of citrus trees. Once the Asian citrus psyllid picks up the disease, it carries it for the rest of its life. Citrus greening disease is also spread by moving infected plants and plant materials such as bud wood and even leaves.

What is the cost of this disease?

Citrus greening disease puts at risk America's entire citrus crop, which was valued at \$3.4 billion in the 2016-17 growing season. Thousands of jobs are threatened, with over 8,200 lost in Florida alone from 2006-2011, according to the University of Florida.

How widespread is the disease?

Citrus greening disease has now been identified in commercial and residential sites in all counties with commercial citrus throughout Florida, as well as in other states in the U.S. such as Alabama, California, Georgia, Louisiana, South Carolina, and Texas.

How is it currently being managed?

Currently, tree removal and intensive insecticide applications as soon as ACP is detected are the only available management options for HLB. These measures are not likely sustainable over the long term for the citrus industry.

How could a genetically engineered (GE) *Citrus tristeza virus* (CTV) help with this disease?

CTV is a virus that is common to citrus trees. Researchers can genetically engineer CTV to carry a gene from spinach that enables the tree to produce a protein known as defensin. The GE CTV is introduced by grafting it onto the tree that needs protection; it is not sprayed or applied to the soil but rather attached

directly to the tree. After the GE CTV is introduced into the tree, the tree will produce the defensin protein. This process shows promise both in protecting trees from contracting citrus greening disease, and in treating trees that are already infected.

What is the purpose of getting a permit from APHIS?

Southern Gardens Citrus Nursery LLC, the developer of this GE CTV, has already conducted small-scale, confined applications of GE CTV with promising results. It now seeks to conduct a large-scale deployment of this GE CTV as a biological control agent. Because the biocontrol agent is a virus of citrus trees, and therefore is a plant pest, USDA's Animal and Plant Health Inspection Service (APHIS) prepared a Pest Risk Assessment to carefully assess the risk to agriculture posed by the proposed deployment, pursuant to the Plant Protection Act. APHIS also prepared a draft Environmental Impact Statement to examine any potential direct and indirect impacts to the environment that might result from approving the permit request.

Does this technique involve genetically engineered trees?

No. This biological control agent approach for controlling citrus greening disease does not involve genetically engineering trees. Instead, the gene from spinach that enables the production of the defensin protein will be delivered to the tree's circulatory system as part of the GE CTV. The genetics of the tree do not change.

CTV is common to citrus trees and has always been in orange juice and other citrus products. The same will be true of citrus food products from trees inoculated using GE CTV. The food products from these inoculated trees will contain the defensin protein that protects against citrus greening disease. Defensin proteins are common in plants consumed by humans, such as spinach, wheat, potato, and sunflower.

Does this approach require other regulatory approvals in addition to USDA APHIS?

Yes. Because this GE CTV is intended to cause the elimination of the pest that causes citrus greening disease, it will undergo an approval process at the Environmental Protection Agency to ensure that its use is safe for the environment and that food from treated trees will be safe to consume.

In addition, we understand that Southern Gardens, the developer of this GE CTV, has contacted the Food and Drug Administration regarding Southern Gardens' work to address citrus greening disease.

Can the GE CTV spread to other trees?

The spread of GE CTV to other trees that have not been inoculated is unlikely. There is not expected to be any distribution and dispersal of this GE CTV beyond the inoculated trees.

This question is addressed in detail in the preliminary Pest Risk Assessment, which is available at the docket listed below.

Why is APHIS reopening the comment period?

We are reopening the comment period on the draft environmental impact statement (EIS) and preliminary pest risk assessment (PRA) regarding the potential environmental impacts and plant pest risk associated with the proposed environmental release of GE CTV. We have updated the draft EIS and preliminary PRA in light of recently published scientific research regarding the insect transmission of CTV. The Agency is sharing this new information prior to finalizing the PRA and EIS in order to provide the information and give the public a chance to comment.

How do I learn more and make a comment?

Go to <https://www.regulations.gov/> and search by docket number APHIS-2017-0018. The draft Environmental Impact Statement and preliminary Pest Risk Assessment are there, and you can make a comment from the same site for a 45-day period ending June 26.

The documents are also available on our [website](#).