

DATE: October 19, 2020

United States Department of Agriculture
Animal and Plant Health Inspection Service (APHIS)

RE: APHIS Petition Number 19-309-01p from the State University of New York College of Environmental Science and Forestry, seeking a determination of nonregulated status for the genetically engineered Darling 58 “American” chestnut.

Dear Addressee,

Please consider the following as official comments regarding the petition from the State University of New York College of Environmental Science and Forestry (ESF) for non-regulatory status of the blight-tolerant Darling 58 (D58) “American” Chestnut.

If approved the D58 genetically engineered (GE) “American” Chestnut will be the first GE forest tree planted or released specifically to grow, reproduce and spread freely throughout the eastern deciduous forests of the United States.

While ostensibly an attempt to bring back the American Chestnut (*Castanea dentata*) (AC) from its current decimated levels resulting from the introduced fungal blight (*Cryphonectria parasitica*) and from massive logging at the turn of the 20th century, a thorough review of the potential impacts have not been adequately addressed. Once the new D58 trees are released there will be little that can be done to effectively track or limit, much less reverse the spread of the never before introduced GE material into the forests. It is imperative that more, long term studies are undertaken which more completely and thoroughly analyze the possible impacts prior to lifting the USDA regulatory status of the experimental, D58 organism.

Under the authority of the plant pest provisions of the Plant Protection Act (7 U.S.C. 7701 *et seq.*), the regulations in 7 CFR part 340, “Introduction of Organisms and Products Altered or Produced Through Genetic Engineering Which Are Plant Pests or Which There Is Reason to Believe Are Plant Pests,” regulate, among other things, the introduction (importation, interstate movement, or release into the environment) of organisms and products altered or produced through genetic engineering that are plant pests or that there is reason to believe are plant pests. Such organisms and plants developed using genetic engineering are considered “regulated articles.”

The regulations in § 340.6(a) provide that any person may submit a petition to the Animal and Plant Health Inspection Service (APHIS) seeking a determination that an article should not be regulated under 7 CFR part 340. Paragraphs (b) and (c) of § 340.6 describe the form that a

petition for a determination of nonregulated status must take and the information that must be included in the petition.

The ESF petition to APHIS states that the D58 is an American chestnut that has been genetically engineered for fungal resistance to chestnut blight caused by *Cryphonectria parasitica* and is unlikely to pose a plant pest risk and, therefore, should not be a regulated article under APHIS' regulations in 7 CFR part 340. The petition by ESF and accompanying conclusions is insufficient at best. Granting the ESF petition without APHIS undertaking a full blown environmental impact study (EIS), in accordance with the National Environmental Policy Act (NEPA) would be arbitrary and capricious and not in accordance with the law.

According to the petition, resistance to the exotic blight pathogen in D58 chestnut trees was “enhanced” by adding a gene for the oxalate oxidase (OxO) enzyme. This enzyme has no direct fungicidal properties, but seems to detoxify oxalic acid (oxalate) produced by the fungus in the studies conducted on young, American chestnut trees, preventing the acid from killing the chestnut tissues, which can lead to lethal cankers on the trees. In the presence of OxO, the damage caused by the oxalate is significantly restricted, resulting in superficial cankers. For this reason, the young trees seem to coexist with the fungus in a manner similar to Asian chestnut species in the fungus' natural range. While OxO is a naturally occurring enzyme, no natural pathway has been discovered in which OxO concentrations as found in wheat plants are found to exist in American chestnuts (AC), without genetically engineering ACs in a laboratory. Even so, ESF considers the artificial introduction or insertion of this otherwise unnaturally found enzyme into native American chestnuts to be somehow natural and not exotic. We disagree as genetically modified D58 organisms are not only not American chestnuts, they represent the non-native organism with invasive species characteristics.

Short term studies were conducted and data gathered by ESF on multiple parameters and used by the applicant to evaluate agronomic characteristics and product performance. To release D58 trees it is important for the agency to recognize that D58 organisms truly are “a product,” and not a native tree. Their release threatens the integrity of eastern native deciduous forest ecosystems, going far beyond the concept of agricultural “product performance.” APHIS is required to use the ESF data and other information, “to determine if the new variety poses a plant pest risk.”

The D58 genetically engineered chestnuts use OxO derived from agriculturally produced, fast growing, herbaceous and short lived wheat (monocot)plants compared to the notably slower growing, woody and considerably long lived (dicotyledon) chestnut trees. While the OxO enzymes appear to be non toxic and not otherwise detrimental, all D58 testing was only observed on young trees and undertaken during a very short timeframe. In relation to the potential lifespan of over 200 years for its naturally occurring American chestnut counterpart (prior to introduction of the blight), it is irresponsible to release this GE tree into the wild without even knowing if the new D58 trees will have the same long lifespan of its natural AC

counterpart. If the D58 trees do happen to live long will the OXO enzyme remain safe and effective over the unstudied and possibly centuries long lifespan? As so many agricultural crop pathogens have mutated over time to combat agricultural insecticides, herbicides, fungicides and even genetically modified crops in the past, is it not likely that the chestnut blight fungus will merely react similarly by eventually rendering the OxO enzyme ineffective in controlling canker growth? Is it also not likely that the OxO enzyme will later be found to negatively effect the structural integrity of the wood or some other important characteristic in chestnut trees 50 years or older? This glaring deficiency, highlights the fact that the true cumulative impacts from introducing this organism into otherwise natural forest ecosystems has not been thoroughly considered.

Should the D58 chestnuts eventually reach maturity and the possible 120 feet in height as historically documented by AC trees, the overall impacts on the makeup and health of eastern deciduous forests must be considered. Will wind blown GE pollen from the D58 trees saturate forests and neighboring landscapes and if so, what would be the cumulative impacts from the OxO laden pollen? For decades, eastern forest management has centered around Oak and Hickory dominance. Considering how dominant the natural AC trees once were, would the D58 Chestnut trees disrupt the relative dominance of Oak and Hickory and if so, what would be the impact? What happens to wildlife species that now rely on the varied size and makeup of acorns and hickory nuts from the numerous oak and hickory species found in eastern U.S. deciduous forests? The American Chestnuts historically produced more consistent annual crops and inordinately higher amounts of nuts than oaks and hickories produce annually. How will wildlife adapt to such a change in the makeup of forest mast? For the wildlife that does adapt, what will be the impact from consuming large amounts of the OxO enzyme found in the D58 chestnuts on those particular animals? If D58 chestnuts are deregulated for release in the wild and live long enough to continue reproduction, they will likely spread quickly due to the heavy nut production, hence high reproductive tendency by ACs. Should any long term negative impacts arise from the wheat gene insertion that was not observed in the short term studies, all the remaining naturally occurring American chestnut trees will likely be contaminated from the defective D58 tree pollen. This would likely eliminate any possibility of the slower yet less dangerous, natural selection on the last remaining native American chestnut trees.

Provided the D58 chestnuts reach similar maturity and spread of the natural AC trees, the effects on neighboring non-forested property including meadows, wetlands, residential areas, agricultural crops, nursery stock, vineyards and orchards has not been considered.

The effects of the increase concentration of the OxO enzyme into the forests mycorrhizal fungi network has also not been thoroughly addressed. While preliminary studies indicated OxO did not seem to harm mycorrhizal fungi, the studies did not examine the impacts on the complex mycorrhizal fungi network. It is presently not known if this enzyme could disrupt this very complex but vital network. The eventual decay from D58 foliage, Chestnut fruit, dead fall and

ultimately dead D58 trees, could introduce unprecedented levels of genetically engineered material onto the forest floor, soils and the mycorrhizal system. Studies have not adequately addressed the cumulative impacts and long term consequences from such an introduction. There is clearly reason to believe that the introduction (interstate movement and release into the environment) of the D58 organisms produced through genetic engineering may very well become plant pests. As such the D58 organisms developed using genetic engineering should continue to be considered “regulated articles,” at least until more, long term research is conducted.

The right of sovereign nations should also be addressed regarding this proposal. Granting non-regulated status to D58 trees will not give proper consideration to indigenous peoples whose traditional lands fall within the historical range the American Chestnut and the potential propagation of GE AC trees.

For the foregoing reasons, considering the complexity and possible long lifespan of the D58 organisms, the studies to date in support of the petition to remove its regulatory status of the D58 chestnut have clearly not taken the hard look nor considered the long term cumulative impacts as required by undertaking a full blown Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) (40 CFR part 1500-1508). *See also APHIS' NEPA implementing regulations (7 CFR part 372)*. As it now stands, granting the petition absent an EIS would also represent an arbitrary and capricious decision by the agency regarding the long-term safety of this proposal to the remaining native American Chestnuts (*Castanea dentata*) specifically, to the American public and to native forest ecosystems overall, in violation of the Administrative Procedures Act (5 U.S.C. § 500 *et. seq.*)

Thank you for considering these comments and please keep us informed regarding the status of this petition review process.

Sincerely,

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