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SUPPORTING THE USE OF GMOS FOR THE PROTECTION AND RESTORATION OF U.S. NATIVE FOREST SPECIES CRITICALLY THREATENED BY INVASIVE PESTS AND PATHOGENS

A policy statement approved by resolution

of the National Association of State Foresters

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INTRODUCTION

The National Association of State Foresters is concerned with the current and future impacts of non-native invasive pests and pathogens and their negative effects on forest health, including the loss and reproductive degradation of native U.S. forest species.

Hereafter, "invasive species'' refers to a species of insect, plant, or pathogen that is not native to a particular U.S. ecosystem or region and whose introduction harms or is likely to harm economies, environments, and/or human health.

The purpose of this paper is to declare support for the use of newly emerging biotechnology to help stem the loss of native forest species due to invasive species infestation. Specifically, this paper addresses the use of Genetically Modified Organisms (GMOs) and supports their use under certain conditions (described later in this paper).

BACKGROUND

The impacts of invasive forest insect and disease species on our nation's forests are an increasing concern for the NASF. Invasive species, such as Asian long-horned beetle, emerald ash borer, gypsy moth, sudden oak death, and hemlock woolly adelgid inflict significant costs, including: (1) losses in urban tree cover, (2) the removal and replacement of infected trees, (3) disrupted natural and agricultural systems, (4) diminished biodiversity and ecosystem services, and (5) losses in timber and raw materials that support domestic industries and renewable products.

During the past 100 years, the United States witnessed the biological eradication of two tree species. The American chestnut (*sp. Castanea dentata*) and American elm (*sp. Ulmus Americana*) were decimated by two European invasive pathogens, respectively, the chestnut blight (*sp. Cryphonectria parasitica*) and Dutch elm disease (*sp. Ophiostoma ulmi*). The loss of these two tree species has been both ecologically and economically devasting to rural and urban forests, alike.

Prior to the introduction of the Chestnut fungus, the American chestnut made up approximately 60% of forests in the Eastern U.S. This species provided food for wild turkey, black bear, white-tail deer, and eastern gray squirrel, all of which suffered severe population decline following the chestnut's demise.[1] Economic impacts were also severe. Not only did American chestnuts provide an important food source for Appalachian and Alleghany subsistence farmers, they also provided important cash flow to these same populations who harvested and sold the chestnuts to eastern urban markets.

The loss of the American elm also proved economically devasting to U.S. urban areas. Prior to Dutch elm disease, American elm was abundant in U.S. cities and towns from the 1930s

[1] Potter, K.M., Escanferla, M.E., Jetton, R.M., Man, G., Crane, B.S., Prioritizing the conservation needs of United States tree species: Evaluating vulnerability to forest insect and disease threats, Global Ecology and Conservation (2019), doi: https://doi.org/10.1016/ j. gecco. 2019.e00622

through the 1960s. These trees provided shade, reduced noise, and boosted home values as they matured. With the introduction of Dutch elm disease, thousands of communities lost important tree cover in very short periods of time, diminishing the beauty of urban neighborhoods and parks and forcing municipalities and homeowners to pay to remove and dispose of diseased trees.

It is now estimated that at least 15 tree species are now at risk of eradication within the next 50 years due to invasive pests and pathogens. These include several species of ash and oak, as well as the Eastern hemlock, black walnut, American beech, and bay laurel.

Where NASF Stands

The early detection of invasive species is crucial to mitigating their effects. Quoting from NASF's Forest Invasive Species Management Policy Statement, "…the nation's current protection system is piecemeal; it lacks adequate rigor and comprehensiveness, virtually ensuring that invasive species will continue to arrive and spread. Preventing species from reaching our shores combined with an early detection and rapid response capability remains the most effective option to reduce the impacts…"

NASF continues to support traditional tree breeding methods and integrated pest management in the fight against invasive species. However, when these efforts cannot offer timely remediation, additional tools need be introduced. Recent scientific advancements in biotechnology now offer an additional tool in the use of species protection against invasive pests and pathogens. One such tool is Genetically Modified Organisms (GMOs).

GMOs are regulated through the USDA and have been available to the agricultural community since 1994, starting with the introduction of the GMO tomato.[2] Agricultural GMOs are now commonplace and found in one form or another on almost every American dining table. The recent development of GMO American chestnut, engineered to resist the chestnut blight fungus, marks one of the first efforts to bring GMOs to bear in the forestry community. These developments open the door for the introduction of additional GMO tree species into rural and urban U.S. forests where traditional tree breeding practices and integrated pest management have not been effective.

RECOMMENDATIONS

Seeing the potential positive impact of GMOs in the forestry community, **the National Association of State Foresters supports the use of genetically modified organisms (GMOs) for the protection and restoration of U.S. native forest species critically threatened by invasive species with the following conditions:**

1. The subject species meets USDA/APHIS/EPA guidelines for the introduction of GMOs and is approved by such agencies as set forth in U.S. regulation.

[2] Science and History of GMO and Other Food Modification Processes: USDA FDA publication. 04/2020

2. The subject species is recognized by USFWS as a native U.S. forest species.
3. The subject species is recognized by USFWS as "no longer reproductively viable" in its natural range or in jeopardy of no longer being reproductively viable in its natural range due to invasive species depredation.

This policy is written for the specific use of GMOs in U.S. forests for the purpose of protecting and restoring native forest species. It is not intended to preclude future NASF policies that refer to biotechnologies for enhancing forest conditions.

SUPPORTING MATERIALS

FAO 2000 Statement on GMO Use in Agriculture, Forestry and Fisheries: "FAO recognizes that genetic engineering has the potential to help increase production and productivity in agriculture, forestry and fisheries. It could lead to higher yields on marginal lands in countries that today cannot grow enough food to feed their people."

European Commission Directives Regarding Use of GMOs in Europe: A Genetically Modified Organism (GMO) is an organism whose genetic material has been altered either by adding or deleting certain traits. The European Commission has developed a broad legislative framework to ensure that GMOs and GMO-derived products that are grown, marketed and imported to the EU meet certain safety standards.

Applicable Legislation:

- Directive 2001/18/EC on the deliberate release into the environment of GMOs: this applies to the experimental release of GMOs into the environment and the placing on the market of GMOs.
- The placing on the market of GMO food and feed or food and feed products containing or consisting of GMOs is regulated by Regulation (EC) No 1829/2003 on genetically modified food and feed.
- Regulation (EC) No 1946/2003 on transboundary movements of genetically modified organisms governs unintentional transboundary movements of GMOs as well as exports of GMOs to third countries.
- Directive 90/219/EEC, as amended by Directive 98/81/EC, on the contained use of genetically modified microorganisms (GMMs). This Directive regulates research and industrial work activities involving GMMs.
- Labelling and traceability requirements are laid down in Regulation (EC) No 1829/2003 and Regulation (EC) No 1830/2003
- Regulation EC 65/2004 on establishing a system for development & assignment of unique identifiers for GMOs.
- There is also a range of legislation which provides for the implementation of these rules.

Society of American Foresters: "Regulation of Genetically Modified Trees: A Position of the Society of American Foresters." Originally adopted on December 1, 2007, and revised and renewed on May 2, 2020.