

United States Department of Agriculture (USDA) Safeguards for Introducing Natural Enemies for Biological Control of Weeds

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Abstract

The importation and release of exotic natural enemies for biological control of weeds into the United States require special safeguards by APHIS of the USDA, because of the threat of introducing plant pests of agricultural importance and organisms that may adversely impact on the environment. These safeguards are found in the following protocol developed specifically for biological control of weeds: (1) The researcher is expected to conduct extensive studies in overseas laboratories, concentrating primarily on host-specificity responses, potential conflicts-of-interest, and overall suitability for introduction into North America. (2) Research proposals on the introduction of potential candidates are submitted to the Technical Advisory Group (TAG) on the Introduction of Biological Control Agents of Weeds. The TAG will evaluate the research proposal on the thoroughness of the research, pest risk/benefit considerations, potential conflicts-of-interest, effects on wildlife, endangered species, the human environment, and whether additional studies are needed prior to importation. (3) An approved APHIS permit is required prior to importations into the United States. (4) All imported material must be processed through an APHIS approved quarantine containment facility. (5) Required additional studies in quarantine containment facilities will be reviewed by the TAG. (6) The TAG, States, Canada and Mexico will evaluate the risks to agriculture and the environment prior to any release of an exotic organism from containment facilities. (7) Release from containment requires an approved APHIS permit supported by scientific documentation, and an environmental assessment that there is no significant risk to US agriculture, wildlife, endangered species, and the human environment.

Introduction

This discussion will direct attention to the role of Plant Protection and Quarantine (PPQ) to protect the United States from unwanted agricultural plant pests while accommodating the needs of weed scientists to import and release safe and effective biological control agents of weeds into the United States.

Safeguards prescribed by PPQ are designed to prevent premature release of exotic organisms that could result in their establishment in the United States and cause irreversible damage to our agriculture and human environment.

Role of PPQ

PPQ, along with Veterinary Services and Animal Damage Control comprise the Animal and Plant Health Inspection Service, (APHIS). APHIS is the regulatory action Agency for animals and plants in USDA.

An important part of the mission of PPQ is to protect agriculture in the United States by preventing entry and establishment of unwanted exotic plant pests that are new to or not widely distributed in the United States.

PPQ carries out this mission by enforcing three basic Acts. The three Acts (the *Plant Quarantine Act* of 1912, the *Federal Plant Pest Act* of 1957, and the *Federal Noxious Weed Act* of 1974) provide the authority for PPQ to restrict or prohibit the movement of plants and

plant products, plant pests, and noxious weeds. Enforcement is accomplished by PPQ officers and designees stationed at all major United States ports of entry. In addition, cooperators including United States Customs and the United States Postal Service help APHIS enforce the agricultural quarantine laws.

Permits

Plant pest permits are an integral part of the enforcement mechanism of agricultural quarantines and regulations. Permits are legal authorizations allowing movement into or through the United States, or interstate, of a plant pest or regulated article, or means of conveyance under conditions prescribed by PPQ. To obtain a permit an "Application and Permit to Move Live Plant Pests and Noxious Weeds" (PPQ Form 526) is required. Applications are evaluated by the receiving States and PPQ prior to final PPQ action to approve or disapprove.

Definition of a Plant Pest

The *Plant Pest Act* defines plant pests as

any living stage of: any insects, mites, nematodes, slugs, snails, protozoa, or other invertebrate animals, bacteria, fungi, other parasitic plants, or reproductive parts thereof, viruses, or any organisms similar to or allied with any of the foregoing, or any infectious substances, which can directly or indirectly injure or cause disease or damage in any plants or parts thereof, or any processed, manufactured, or other products of plants.

Residents Only

Any United States resident moving a plant pest into or through the United States, or interstate, is required to have a valid Federal plant pest permit and must comply with the prescribed conditions on the permit. Permits are not issued to nonresidents of the United States. The residency requirement is a matter of legal jurisdiction should conditions in the permit be violated.

Penalty Provisions

Section 108 of the *Federal Plant Pest Act of 1957* sets forth a Penalty up to \$1000 and/or 1 year imprisonment for any person who violates the permit requirement for moving plant pests. Any person who forges, counterfeits, or without USDA authority uses, alters, or defaces any permit is in violation and subject to this penalty.

Permit Philosophy

PPQ does not intend to discourage legitimate research, education, or biological control activities involving the movement of plant-feeding organisms by requiring a permit. Rather, we view the permit procedure as a needed precautionary measure and a means of facilitating the movement of the organisms. Because of the perishable character of living organisms, PPQ can help expedite the movement into and through the United States under safeguards that prevent escape, delay, and loss. Shipments of living organisms not moving under APHIS permits are stopped at the first United States port of entry and are destroyed if found to be plant pests.

The definition of plant pest gives PPQ broad authority over certain arthropods, microorganisms, and mollusks. For example, parasitic mites of honey bees are considered plant pests based upon the "indirectly injure" wording in the definition. It follows that any

invertebrate or pathogen that attacks a beneficial invertebrate or pathogen used in biological control of a plant pest can be considered a plant pest by definition. A common example of this interaction is a hyperparasite attacking a primary parasite of a plant pest. Carrying this concept further, suppose a "beneficial" is released into the environment and outcompetes or replaces a previous biological control agent, resulting in diminished plant pest control? Is this new competing agent a plant pest? It is the role of PPQ to prevent the introduction of hyperparasites, contaminants and harmful plant pests, when possible, by carefully analysing each permit application and prescribing adequate safeguards to minimize any risks.

Pest Risk Evaluation

Before issuing a permit to import an organism, APHIS evaluates the pest risk. APHIS cooperates with the receiving States and when necessary, consults with specialists in the Federal, State, and private sectors in evaluating the risk.

The evaluation process considers the following:

- (1) Potential of the organism to cause injury to United States agriculture;
- (2) Adequacy of containment facility to prevent escape;
- (3) Purpose of the research, number of shipments requested, and need for field studies;
- (4) Chance of establishment should the organism escape into the environment before the organism is determined agriculturally- and environmentally-safe;
- (5) Experience, reputation, and awareness of plant pest risk by the permittee and assistants; and
- (6) Ability to comply with the requirements of individual States and other United States agencies (State pest laws, Food and Drug Administration, Public Health, Department of the Interior, Environmental Protection Agency, etc.).

APHIS Involvement in the Introduction of Biological Control of Weeds

APHIS faces a formidable task of assessing plant pest risk when receiving a request to introduce and release an organism intended for biological control of weeds. Weed control agents, such as plant-feeding arthropods and pathogens, are by definition plant pests. In addition, the target hosts (weeds) are often botanically related to economically-important species. Carefully thought out safeguards are used to prevent the accidental release of harmful organisms.

The essence of APHIS safeguards in biological control of weeds can be found by examining the procedures researchers are expected to follow when importing and releasing agents into North America. These procedures include:

Research of Promising Candidates Conducted Overseas

Preliminary and definitive host feeding tests on various plants are conducted in the country where the biological control agent occurs. These tests are designed to determine host-specificity and identify potential conflicts-of-interest. The tests eliminate from further consideration exotic plant pests that could potentially harm agricultural crops before reaching the United States.

Research Proposals Reviewed by TAG for the Introduction of Biological Control Agents of Weeds

This Group reviews proposals to import and release natural enemies of weeds and recommends to APHIS on the suitability and safety of the candidates. It is composed of Federal, State, and industry representatives. The TAG also solicits replies from Agriculture Canada and Sanidad Vegetal of Mexico.

Authoritative Identification of Exotic Candidates and Weed Hosts

Authoritative verification of both agent and weed host must be documented. Voucher specimens are submitted on two occasions to taxonomic specialists at the Systematic Entomology Laboratory (SEL) of the Agricultural Research Service (ARS); once at the time of importation and again at the time of release into the environment.

Permit Requirement to Import into the United State

APHIS approval to import the agent and weed will depend on TAG recommendations to the proposal and importers' ability to meet the prescribed permit conditions. These conditions require that shipments: arrive in escape-proof packaging at designated United States ports of entry for inspection and clearance; are forwarded directly to one of the APHIS approved high security containment facilities; and that representative samples of the shipment (voucher specimens) are deposited with SEL. Usually the researcher will need to conduct some additional testing and culturing of the agent in the United States prior to release. This additional research is done under containment safeguards.

Exotic Agents into APHIS Approved Containment Facilities

APHIS approves the designs for construction of new facilities and/or modifications of established ones. These facilities are built specifically for conducting research on prohibited organisms under escape-proof conditions. Plant pests that are otherwise prohibited entry into the United States, such as shipments of biological control agents associated with living plant pest hosts, and prohibited plant material may be imported into one of these facilities under permit for processing, identification and elimination of plant pest risk. Only scientifically known disease-free beneficial organisms may be released following an APHIS evaluation and determination.

Additional Research May Be Required and Must Be Reviewed by the TAG and Recommendations Offered to APHIS

If additional research is required, the researcher will submit the additional findings to the TAG. This submission is usually in direct response to the earlier recommendations made by the TAG. The recommendations, arrived at by consensus of the TAG, will be forwarded to the Deputy Administrator of APHIS for action and to the Governments of Canada and Mexico for information.

An Additional Permit Application is Required for Release from Containment Facilities

If the TAG recommends approval, an additional application for a permit to release is required by APHIS. The information in the additional application as well as an environmental analysis submitted by the permittee and using the data and recommendations submitted by the TAG, State, and foreign sources is then evaluated by APHIS.

APHIS Approves or Disapproves the Application to Release the Agent into the United States

APHIS documents its decision to issue a permit or not based on full consideration of relevant information, plant pest risk and environmental concerns. Final approval by APHIS from discovery of the agent overseas to the request for release into the United States takes a minimum of two years. The researcher spends most of this time running tests to ensure that the agent will be beneficial to agriculture and will not cause harmful environmental effects.

Environmental Considerations

The *National Environmental Policy Act*, requires all Federal agencies to consider environmental amenities and values in decision-making and to prepare a detailed written statement called the Environmental Impact Statement (EIS) for major Federal actions which significantly affects the quality of the human environment.

An Environmental Assessment (EA) is a concise public document used to provide evidence and analysis for determining the need for an EIS or serves as an aid in compliance with the ACT when an EIS is not necessary.

If a significant impact is found, an EIS must be prepared by the Federal agency responsible for the action. When there is a finding of no significant impact (FONSI), an EIS is not required.

APHIS requires an EA and possibly an EIS prior to issuing permits for release into the environment of exotic plant pests (including natural enemies of weeds).

APHIS considers and includes in the EA the following:

- (1) Purpose and need for the proposed action;
- (2) Alternatives to the proposed action (no action, herbicides, biological control, etc.).
- (3) Affected environment- Identifies specific elements adjacent to proposed action. Soil, water, air, wildlife, threatened and endangered species, non-target organisms, and human populations are considered.
- (4) Environmental impacts of the proposed action and alternatives. Program action benefits and consequences for each alternative. Non-target organisms must be identified and discussed.
- (5) Consultation and coordination with other agencies, organizations, and individuals. Written records documenting the consultation and coordination is required.
- (6) Conclusion- Effects on the quality of the human environment.
- (7) References- Includes personal communication as well as available literature.

Most of the deliberate releases of exotic insects and pathogens into the environment are for biological control purposes. When the natural enemy is a host-specific insect or pathogen of an insect plant pest, there is little basis for an EIS. Host-specificity is well documented for most beneficial insects and pathogens being used in biological control programs today, including biological control of weeds. The EA will provide sufficient information and evaluation to support a FONSI.

Technical Advisory Group (TAG) on the Introduction of Biological Control Agents of Weeds

As discussed above under APHIS involvement in biological control of weeds, a special protocol has been developed for introduction of exotic agents used in biological control of

weeds. Selected are those organisms that will most benefit United States agriculture, and will ensure no adverse effect on the environment.

A brief discussion follows of the new structure within the TAG. Some changes in function have been made. The TAG is now an APHIS function and replaces the Ad Hoc Working Group which operated under the Joint Weed Committee of USDA and the USDI. The tag Chairman is elected by the membership, and an Executive Secretary is appointed within PPQ.

Functions of the TAG are:

- (1) To review proposals and supporting documentation for the introduction and release of exotic plant parasites and pathogens for biological control of weeds in the United States and, as requested, for similar proposals into Canada and Mexico.
- (2) To provide guidelines for researchers to meet USDA requirements for entry and for release from quarantine containment.
- (3) To recommend actions on all proposals to the Deputy Administrator for PPQ, APHIS.
- (4) To establish an executive board to resolve differences when a consensus of the TAG is not forthcoming.
- (5) To advise on potential conflicts-of-interest and to recommend additional plants for host-specificity studies, where appropriate.
- (6) To seek comments on proposed releases in the United States from Canadian and Mexican scientists and from other scientists as appropriate.

Membership of TAG

Representation is solicited by APHIS for three years from the agencies listed below. These representatives serve as the voting members. Appointments can be renewed, and replacements solicited as may be otherwise required. There are 12 members representing the USDA, USDI, EPA, United States Army, Weed Science Society, and National Plant Board as follows:

United States Department of Agriculture

ARS (representing ARS research interests), the Cooperative State Research Service (representing State research interests), APHIS, PPQ (representing Federal regulatory interests), and the Forest Service (representing timber research) each has one member.

United States Department of the Interior

The Fish and Wildlife Service, the Bureau of Land Management, the Bureau of Reclamation, and the National Park Service each has one member.

Environmental Protection Agency

The Office of Pesticide Programs, Criteria and Evaluation Division has one member.

United States Army Corps of Engineers

The Waterways Experiment Station has one member.

Weed Science Society of America

One non-Federal member appointed by the president, represents the interests of the Society.

National Plant Board

One member represents Board interests.

In 1987 the TAG reviewed 17 research proposals.