

This is the tenth fact sheet in a series of ten designed to provide an overview of key concepts in plant pathology. Plant pathology is the study of plant disease including the reasons why plants get sick and how to control or manage healthy plants.

Sanitation and Phytosanitation (SPS): The Importance of SPS in Global Movement of Plant Materials

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What is SPS and why is it important?

The term SPS refers to Sanitary and Phytosanitary measures and is particularly important in international trade. No country is completely self-sufficient in the production of food (animal and plant-based), fiber, and other products. In order to meet the needs of their citizens, countries usually import agricultural and horticultural products. SPS measures applied to plants are designed to insure the safety of food and to prevent the spread of plant pests and diseases. They may include (i) requiring products to come from areas free of certain pests and diseases; (ii) product inspections; (iii) treatment or processing of products to eliminate pests or pathogens; (iv) maximum allowable pesticide residue requirements; and (v) limited allowances for use of certain food additives.

Unfortunately, international trade provides a mechanism for the introduction of plant pests and diseases into new environments. In order to work to prevent the rapid movement of economically important pests and diseases and to protect their own plant production systems, countries of the world came together under the World Trade Organization (WTO) to negotiate SPS Agreements, which came into existence on January 1, 1995. Annex A of the WTO-SPS Agreement (<http://www.worldtradelaw.net/>

[uragreements/spsagreement.pdf](#)) defines an SPS measure as any measure applied:

- to protect animal or plant life or health within the territory of the member from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms, or disease-causing organisms;
- to protect human or animal life or health within the territory of the member from risks arising from additives, contaminants, toxins, or disease-causing organisms in foods, beverages, or feed-stuffs;
- to protect human life or health within the territory of the



Figure 1. Inspection starts in the field. Many growers scout fields for plant diseases during the growing season. (Image courtesy of Ken Chamberlain)

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member from risks arising from diseases carried by animals, plants, or products thereof, or from the entry, establishment, or spread of pests; or

- to prevent or limit other damage within the territory of the member from the entry, establishment, or spread of pests.

The WTO–SPS Agreement sets rules governing the sanitary and phytosanitary aspects of international trade. It is the regulatory framework aimed to make sure that phytosanitary measures relevant to trade are:

- consistent with international standards;
- justified by scientific principles and evidence;
- harmonized internationally to the extent possible;
- transparent;
- only as restrictive as absolutely necessary to meet the appropriate level of protection required;
- non-discriminatory; and
- appropriate to the conditions in the importing and exporting countries.

The agreement aims to preserve the sovereign right of any government to adopt measures deemed appropriate for protecting the health of citizens, while at the same time, ensuring that such measures are not used arbitrarily, in a protectionist manner, or in such a way that they constitute a barrier to trade. WTO members are encouraged to use international standards, guidelines, and recommendations where they exist. However, countries are also allowed to use other standards and methods for inspecting products, as long as such standards are based on analysis and scientific assessment. Governments are encouraged to use the least



Figure 2. Definitive tests for pests and pathogens contaminating plant materials are carried out in laboratories. (Image courtesy of Ken Chamberlain)

restrictive measures that at the same time meet the plant, animal, and human health objectives.

International organizations

Since the WTO–SPS Agreement addresses issues relating to plant, animal, and human health, SPS standards are set by different international organizations. Phytosanitary (plant health) standards, known as **International Standards for Phytosanitary Measures** (ISPMs) are set by the **International Plant Protection Convention** (IPPC). The IPPC (a branch of the Food and Agriculture Organization) is a multilateral treaty for international cooperation in plant protection adopted by nearly 160 countries. Operational arrangements concerning food safety are treated by the **Codex Alimentarius Commission** of the World Health Organization (WHO) and the FAO, while the **World Animal Health Organization** (WAHO) or Organization International des Epizooties (OIE) deals with issues related to animal health (sanitary measures) and epizootics (relating to animal pathogens that are capable of causing diseases in humans).

What happens when SPS measures are not implemented?

Even when SPS measures are in place, some unknown or overlooked pathway can result in the introduction of an economically important pest, with dire economic consequences. A good example is the introduction of the emerald ash borer (EAB) (*Agrilus planipennis* Fairmaire) into North America in the 1990s. It entered the United States through solid wood packing material used in airplanes and shipping cargo. The beetle, which is native to Asia, was first reported killing ash trees in the Detroit and Windsor, Ontario, Canada, areas in 2002. Since then, it has spread to nine states in the United States including the following: Ohio in 2003; northern Indiana in 2004; northern Illinois and Maryland in 2006; western Pennsylvania and West Virginia in 2007; and Wisconsin, Missouri, and Virginia in summer 2008. It has also spread to parts of Canada.

Nearly 114 million feet (33,000m³) of ash timber, with a value of \$25.1 billion, is grown in the eastern United States each year. The emerald ash borer has already killed millions of ash trees, and is a threat to decimate billions more. The accidental introduction of this one invasive pest occurred in spite of rigorous SPS measures.

Quarantine pathogens and regulatory needs common to all members

The English word *quarantine* comes the Italian *quaranti giorni*, which means “40 days.” Following the arrival of the Black Death in Europe in the mid-1300s, a waiting



Figure 3. The emerald ash borer is about 1/2 inch in length and 1/8 inch wide. The average adult beetle can easily fit on a penny. It was first found in Ohio in 2003. (Image courtesy of Joe Boggs)

period of 40 days was imposed for all ships intending to dock at Italian harbors. The waiting period allowed any latent infections to manifest. Decisions as to whether the ship would be allowed to dock and discharge passengers or not depended on the health of the passengers at the end of the waiting period. This precautionary principle is used today for animals and plants of suspect or unknown health status that arrive at national entry points (air or sea ports or land border crossings). The term is also applied regarding plant safety and crop protection to refer to general measures aimed at preventing the spread of harmful organisms from infested to non-infested areas. Quarantines are applied by staff of the National Plant Protection Organization (NPPO) of each country. In the United States, the NPPO is the Animal and Plant Health Inspection Service (APHIS — http://www.aphis.usda.gov/plant_health/). NPPOs draw up lists of exotic pests (weedy plants, arthropods, molluscs, fungi, bacteria, viruses, etc.) that they want to keep out of their territory. Such organisms are known as regulatory pests, select agents, or high consequence organisms.

Government regulatory measures

The use of quarantines is regulated by local, state, regional, national, and international agencies and authorities. Strict government inspections and quarantines of imported plants, plant products, and soil have kept pests out of many countries and many areas. However, modern air travel and international trade greatly increased the possibility of introducing pests dangerous to people, plants, and animals from one country or region to another. In addition to passive or accidental means for moving pathogens and pests, the recent anthrax attacks in the United States highlight

the potential for the intentional release of exotic pests and pathogens as agents of bioterrorism. Recent outbreaks of mad cow disease, avian influenza virus, foot and mouth disease, soybean aphid, and soybean rust emphasize the continued need for strict government monitoring and enhanced reporting and response programs for key pests and diseases. The U.S. National Plant Diagnostic Network (NPDN), which was organized following the events of September 11, 2001, is an excellent example of such an effort. The NPDN was designed and implemented to enhance agricultural security within the United States by linking plant disease and pest specialists at land-grant universities and government agencies so that high-consequence pests and pathogens could be quickly identified and an appropriate response coordinated.

In some cases, certain plants or plant products are forbidden entry into the country or areas of the country, and agricultural inspectors check luggage for such outlawed products. Travelers coming into the United States should not attempt to import such agricultural materials as fruits, vegetables, plants, bulbs, seeds, or cuttings unless advance arrangements have been made and a permit obtained. Any such plant materials being carried or imported through commercial channels must be reported to agricultural quarantine or customs officials upon arrival. Some plant materials cannot be brought into the United States at all from certain locations without precautionary treatment. For example, mangoes, guavas, and passion fruit from Hawaii are not permitted entry into the U.S. mainland, since they may be carrying the Mediterranean fruit fly, which is widespread in Hawaii but absent on the mainland. If introduced into California, for example, the fly could devastate the state's huge fruit industry. However, such plant products can be imported commercially if they are properly fumigated to kill the pests before shipping. Certain kinds of living plant material can be imported into the United States under permit, or if quarantined after entry for two growing seasons to reveal any diseases.

Government eradication programs are conducted when a serious insect pest or disease breaks out. Often the trouble is eliminated before it has a chance to spread. Such programs require highly trained personnel who know the potential insect and disease problems and are able to recognize the pathogens and pests and their signs and/or symptoms.

More recently, SPS measures are being implemented in home countries through the use of IPHM. The idea here is to make sure plants are produced using best management practices, which in turn will reduce the possibility of spreading pest or diseases to other countries.

Links

1. World Trade Law “Agreement on the Application of Sanitary and Phytosanitary Measures,” <http://www.worldtradelaw.net/uragreements/spsagreement.pdf>
2. World Trade Organization, http://www.wto.org/english/tratop_e/sps_e/sps_agreement_cbt_e/intro1_e.htm
3. USDA Forest Service, Emerald Ash Borer, <http://www.emeraldashborer.info/index.cfm>
4. USDA National Invasive Species Information Center, <http://www.invasivespeciesinfo.gov/>
5. Invasive and Exotic Species, <http://www.invasive.org/>
6. Nonindigenous Plant Pathogens, <http://www.apsnet.org/online/feature/exotic/>
7. USDA APHIS (Animal and Plant Health Inspection Service), <http://www.aphis.usda.gov/>
8. USDA APHIS Plant Health, http://www.aphis.usda.gov/plant_health/index.shtml
9. Ohio Department of Agriculture, Plant Industry Division, <http://www.agri.ohio.gov/divs/plant/plant.aspx>
10. Phytosanitation Module through Moodle: <http://production.cfaes.ohio-state.edu/apps/courses/cfaes>
11. Case Study: SPS agreement and export of Senegalese mango to the EU, French version, <http://www.youtube.com/watch?v=31ri45WRQkg>
12. Aflatoxin contamination of Melon seed exports from Nigeria and implications for international trade, <http://www.youtube.com/watch?v=yRHOIvI7XyA>
13. Introduction to Sanitation and Phytosanitation, http://www.youtube.com/watch?v=L_5i0xSA7uI
14. Enhancing International Trade Through Sanitation and Phytosanitation, <http://www.youtube.com/watch?v=sLfnbPZfgs4>
15. <http://www.nature.org/initiatives/invasivespecies/help/>
16. http://www.ucsus.org/invasive_species/what_you_can_do/what-you-can-do-to-prevent.html
17. <http://www.niiss.org/cwis438/websites/niiss/home.php?WebSiteID=1>
18. http://www.nappo.org/menu_e.shtml
19. http://www.ustr.gov/Trade_Agreements/Bilateral/CAFTA/CAFTA-DR_Final_Texts/Section_Index.html

Introduction to Plant Disease Series

- PP401.01: Plants Get Sick Too! An Introduction to Plant Diseases
- PP401.02: Diagnosing Sick Plants
- PP401.03: 20 Questions on Plant Diagnosis
- PP401.04: Keeping Plants Healthy: An Overview of Integrated Plant Health Management
- PP401.05: Viral Diseases of Plants
- PP401.06: Bacterial Diseases of Plants
- PP401.07: Fungal and Fungal-like Diseases of Plants
- PP401.08: Nematode Diseases of Plants
- PP401.09: Parasitic Higher Plants
- PP401.10: Sanitation and Phytosanitation: The Importance of SPS in Global Movement of Plant Materials

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