3 History of Plant Quarantine and the Use of Risk Analysis

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3.1. Introduction

> We should have ever in mind that quarantine must be based on biological principles established through scientific research, that inspection and regulation are makeshift, although necessary, measures forced upon us by the failure to prevent the original invasion of these pests, and that it is our paramount duty to contribute out of our abundant opportunity to fundamental investigations of means of preventing the introduction and spread of insects and plant diseases.

Those words were written nearly 100 years ago by W.A. Orton (Orton, 1914) in his discussion of problems facing plant quarantine, but the sentiment still holds true to this day. Orton went on to call for specific domestic actions and for greater international cooperation in preventing the spread of pests.

Although pest risk analysis is a relatively new discipline, the story of quarantine and plant protection begins more than 600 years ago. This chapter will highlight four key components that together have brought us to where we are today in analysing the risks associated with the introduction and spread of pests: enacting national and international laws and regulations; understanding and analysing scientific information as the basis for those laws; international cooperation to ensure success of those laws; and finally, establishing risk and risk analysis as the basis for decision making.

3.2. Origin of the Concept of Quarantine

The concept of quarantine is not new – it dates back hundreds of years to the Middle Ages, at a time when the bubonic plague, or Black Death, was spreading across Asia and into Europe. As with diseases and pests today, the bubonic plague spread through human movement, largely related to human migration and the trade in goods coming from Asia and arriving in Europe. Italy was a major stop on the trading routes, and it is from the Italian word for 'forty' or *quaranta* that the term quarantine is derived (Gensini *et al.*, 2004).

In 1377, the seaport of Ragusa (then part of the Venetian Republic) enacted laws that required travellers to remain in isolation (or quarantine) for a period of 40 days to prevent introducing plague to the city. This requirement was actively enforced, and those who violated the law were subject to fines or other penalties. Subsequent to that first law, other countries also enacted similar laws aimed at protecting their citizens from the spread of a deadly disease (Gensini *et al.*, 2004).

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As time went on, the laws established, in effect, the first quarantine stations – places where individuals could be isolated from the rest of the population in order to assess whether they were carrying the disease (Gensini *et al.*, 2004). What is remarkable about these actions and laws is that, at that time, there was a very poor understanding of disease transmission and infectious agents. None the less, those measures applied more than 600 years ago are not much different than the same types of measures we still use today to protect ourselves from the spread of harmful diseases and organisms.

3.3. Quarantines, Phytosanitary Measures and Plant Health

3.3.1. Early plant protection laws – 1600s–1800s

Today, the term 'quarantine' is often used in plant health to refer generically to any phytosanitary measure. However, strictly speaking, quarantine (e.g. isolating an organism to determine if it is carrying pests) is one type of measure (IPPC, 2010). Other types of measures include laws and regulations, inspection, treatments, surveillance, certification or other activities aimed at managing pests (IPPC, 2010). In the case of plants, the first phytosanitary measures designed to protect plant health came about 300 years after the first quarantine laws were enacted to protect human health.

One of the first plant protection laws, enacted in France in 1660, was aimed at controlling the spread of wheat stem rust (*Puccinia graminis* Pers.), an important disease of wheat. Although the specifics of the disease were poorly understood, farmers deduced that barberry plants (an alternate host for the fungus that causes wheat stem rust) growing in close proximity to wheat made the disease worse. Therefore, the law at that time allowed for the destruction of barberry plants. Other places followed suit – Rhode Island and Massachusetts in the United States passing similar laws in the 1700s (Roelfs, 2011), and several states in Germany (Ebbels, 2003) passing laws to control barberry in the 1800s.

3.3.2. Science and early regulatory plant protection

Beginning in the late 1800s, countries began putting in place specific laws to prevent the entry or spread of exotic pests. This period of time coincided with a growth in scientific knowledge about plant pests – prior to the 1800s, decisions were largely based on only a crude understanding of how pests affected plant health. However, the 1800s began a time of scientific exploration, particularly in the field of natural biology. And as our understanding of organisms (particularly plant pests) grew, so did our ability to analyse those organisms and base control actions for those organisms on the best scientific information available. Interestingly, most of these laws came about due to the introduction and/or spread of just a few key pests like the grape phylloxera (*Daktulosphaira vitifoliae* (Fitch)) and Colorado potato beetle (*Leptinotarsa decimlineata* (Say)).

In 1874–1875, the Colorado potato beetle, considered one of the most destructive pest of potatoes at the time, was introduced into Germany, in particular near major ports of entry. Swift action was taken to eradicate the localized populations and, in 1875, Germany enacted a decree prohibiting the importation of potatoes, and materials associated with potatoes (e.g. packing materials, sacks, etc.) (Mathys and Baker, 1980). Thus, this legislation was one of the first that established a link between a serious pest and controlling the pathways (e.g. the materials associated with potatoes) by which the pest can move from one place to another.

The grape phylloxera, a tiny aphid-like insect, feeds on the roots and leaves of grapevines. It had been introduced to France on grape cuttings from the United States in 1859, and over the next 20 years spread throughout the grape-producing regions of Europe. By the late 1800s the grape phylloxera was causing major devastation to vineyards all over Europe, and in France, the losses to the wine industry were considered massive. The grape phylloxera was also introduced into Victoria and New South Wales, Australia in 1872 on vine cuttings from France. It soon became a major pest in vineyards in Australia, and in 1877 strict legislation was enacted to control the pest (Maynard *et al.*, 2004).

As a result of the devastating losses to the wine industry, countries became aware of the need to prevent the spread of this pest, and in 1878, the first international agreement for cooperation in preventing of a spread of a pest was adopted. The International Convention on Measures to be Taken against *Phylloxera vastatrix* (the name the pest was originally assigned in Europe) was signed by several European countries. The agreement included several provisions that are echoed in later treaties for plant protection, including prohibiting the movement of certain material, the exchange of information about the pest, requirements for inspection, and allowance for the written assurance that materials in trade were free of the pest (Ebbels, 2003).

The story of the control of grape phylloxera did not end there however. European countries were desperate to find effective controls for the pest, and the solution came from the very place the pest had originated – the United States. An American entomologist named C.V. Riley was instrumental in demonstrating that the pest affecting grapes in France was the same species as a pest of grapes in the United States. Through scientific investigation, C.V. Riley established that certain varieties of grapevine grown in the United States were resistant to the pest. Beginning in 1871, resistant varieties were shipped to France and, by 1872, over 400,000 cuttings had been shipped to revitalize the French wine industry (Sorensen *et al.*, 2008).

The spirit of international cooperation in controlling this pest continued over the next several years. Riley's French colleague, J.E. Planchon – the principle investigator into the grape phylloxera in France – visited Riley in the US in 1873 and continued scientific investigations into the pest and the apparent resistance of US varieties of grapevines. Further investigations continued over the next several years, with scientists travelling back and forth between countries, primarily researching which roots stocks were most resistant. Riley's initial contributions were ultimately recognized when, in 1889, he was awarded the Legion of Honour by the French government (the country's highest recognition) in honour of his work (Sorensen *et al.*, 2008).

Other pests were the subject of national and international regulations during that time as well. In 1877, four American states (Kansas, Missouri, Minnesota and Nebraska) enacted legislation aimed at controlling the spread of the Rocky Mountain locust (*Melanoplus spretus* (Walsh)), grasshoppers that were documented to swarm in devastating numbers (Norin, 1915). The purpose of the legislation was not to prevent the migration since the available scientific information indicated that migration could not be prevented. Therefore, based on the state of knowledge, and the best available science, the legislation was aimed at controlling the pest locally so that the outbreaks would be reduced in subsequent years.

Around the end of the 1800s, we begin to see that plant protection legislation was taking into account the biology of the pests and the state of scientific knowledge at that time, as in the case above. Another example is that DeBary established, based on scientific evidence, that barberry served as an alternate host for the fungus that caused wheat stem rust (the first pest subject to plant protection laws highlighted earlier). This finally established the scientific basis for the regulations that had been enacted more than 200 years prior. Subsequent to his discovery and beginning in 1869 through the 1920s, several European countries and US states enacted laws for the eradication of barberry as a means of controlling wheat stem rust (Ebbels, 2003).

3.3.3. The first broad national phytosanitary laws

As a result of several serious pests being introduced to different countries in the late

1800s, it soon became apparent that broader action was needed to prevent future pests from causing similar damage. For European countries, the San Jose scale (*Quadraspidiotus perniciosus* (Comstock)) was of great concern (Mathys and Baker, 1980). It was a serious pest of fruit trees and there were concerns it could be carried on nursery stock, and establish in Europe much like the grape phylloxera had several years before. Countries came to understand that prevention was the best strategy and that regulating on a pest by pest basis would not be as effective.

Several countries all over the world began to enact broad laws for plant protection and establish national plant protection services responsible for exercising those laws. In 1887, Great Britain passed the Destructive Insects Act and established a Board of Agriculture. The act was revised in 1907 to become the Destructive Insects and Pests Act that addressed both insects and pathogens (Ebbels, 2003). Similarly, in 1899, the Netherlands established a national plant protection service whose purpose was to prevent the introduction of new pests. France and Germany also passed similar laws during that time period, restricting the movement of nursery stock and fresh fruits.

Other countries, in particular colonies or former colonies of European countries, also began passing quarantine laws during that time. The Cape of Good Hope, in what is now South Africa, passed 'An Act to Regulate the Introduction into This Colony of Articles and Things, By reason of Disease or Otherwise, Might be Injurious to the Interests Thereof' in 1876, and Australia passed its first federal plant quarantine law in 1907 (Norin, 1915). Canada initially passed the San Jose Scale Act in 1898 after the pest was introduced into California, and then later passed the Destructive Insects and Pests Act in 1910, granting government the power to take appropriate actions to prevent the entry and spread of pests. Interestingly, one of the restrictions in the act was to limit importations into Canada to certain seasons of the year, presumably as a measure to reduce the risk of pest establishment.

3.3.4. Risk enters the picture – The US Plant Quarantine Act of 1912

Over the next 20 years, other countries would follow suit, establishing national plant protection services and enacting broad laws and regulations (as opposed to the species-specific laws enacted in the 1800s) aimed at preventing the introduction and spread of plant pests. The USA passed the Plant Quarantine Act of 1912 after several more serious pests had been introduced (Castonguay, 2010). This act granted the Secretary of Agriculture the authority to restrict and control the importation of plant pests, in particular by restricting the entry of nursery stock and other types of plant products that could carry pests (Weber, 1930).

The act included provisions for various types of phytosanitary actions including phytosanitary inspections (for both foreign and domestic products) of different commodity classes (e.g. nursery stock, fruits and vegetables for consumption), certification, phytosanitary treatments and other key functions for protecting plant health.

Over the next several years, different quarantine regulations were promulgated under the act. These included both domestic and foreign quarantines aimed at particular pests or commodities or commodity classes. The first broad quarantine enacted under the Plant Quarantine Act came in 1919 under 'Quarantine 37', which related specifically to nursery stock (Weber, 1930).

It is worth noting that at the time the original act was passed in 1912, special concessions were granted to nurserymen who were resistant to having undue restrictions placed on the importation of nursery stock. What was finally agreed under Quarantine 37 (or 'Q-37' as it is commonly known) was that importation of nursery stock would be allowed, if the material was exported from countries having official inspection and certification systems. Under these circumstances, import permits could be issued, and inspection and certification were a condition of entry. Material from countries lacking inspection and certification systems was prohibited, except for experimental or scientific purposes, and then only under permit (Weber, 1930).

The passage of Q-37 was the subject of considerable controversy. G.A. Weber (1930) noted:

> Few if any acts of the Department of Agriculture have aroused so much discussion and so much adverse criticism and condemnation on the one hand and commendation on the other as the promulgation by the Secretary of Agriculture on November 18, 1918, effective June 1, 1919, of 'Nursery stock, plant, and seed quarantine No. 37,' the purpose of which is 'to reduce to the utmost the risk of introducing dangerous plant pests with plant importations'.

Nursery stock was understood to be 'risky' material in terms of its ability to carry unwanted pests, so controls on the importation of nursery stock were deemed necessary by scientists and government officials. However, the industry groups resented the hindrances on trade, noting in particular that the restrictions were in effect an embargo on trade, and that other countries may retaliate against US exports as a result of restrictions on their exports to the USA. In essence, the industry groups were concerned that other countries would view the regulations as unjustified and disguised barriers to trade – a discussion that still goes on today.

This seeming tension between protecting a country from the spread of pests, while not implementing undue restrictions on trade remains with us today and is the reason for establishing one of the major international agreements governing phytosanitary measures – namely the Agreement on the Application of Sanitary and Phytosanitary Measures. This Agreement is covered in detail in Chapter 4.

What is important to understand here is that the debate over Q-37 demonstrated, for the first time, the need to balance the risks associated with the movement of plant material and for measures to manage those risks against the need for establishing rules for trade that were fair, predictable and – most importantly – based on science.

Another major regulation under the Plant Quarantine Act was that of 'Quarantine 56' (or Q-56) regulating the importation of fresh fruits and vegetables for consumption. Materials regulated under Q-56 are subject to prohibitions unless specifically permitted. Ironically, the Q-56 regulations were, and still are, more restrictive than the Q-37 regulations, even though the risk associated with materials for consumption is generally much lower than for nursery stock. This apparent contradiction in the regulations compared with the level of risk remains under debate – efforts to modify Q-37 regulations to address the level of risk associated with nursery stock are still controversial, 100 years after the original law was enacted.

3.4. International Cooperation – Finding Solutions Through Mutual Interests

The introduction of grape phylloxera into Europe, and the introduction of other pests into the USA, played a major role in highlighting the need for international cooperation – both in scientific research and in the development of internationally coordinated plant protection regulations. In the late 1800s, scientists all over the world recognized the need to exchange scientific information about pests, particularly with respect to control and prevention of those pests (Castonguay, 2010; MacLeod *et al.*, 2010).

Various levels of cooperation were already taking place on a pest by pest basis, as evidenced by the cooperative efforts between the USA and France to control grape phylloxera. But larger efforts were needed, and scientists in many countries embraced the cause. In 1891, a Swedish botanist named Jacob Eriksson called attention to the need for international cooperation to prevent the spread of pests at the International Congress for Agriculture and Forestry meeting at The Hague. He continued his efforts, and in 1903 he presented the cause again to the International Congress, meeting in Rome (Ebbels, 2003).

Around the same time, an American named David Lubin was petitioning governments in Europe for the formation of an international organization that would gather and disseminate information on agricultural issues. Because of the efforts of these two men, and wide support from scientists and scientific organizations, the International Institute of Agriculture was established in Rome in 1905, under the patronage of the King of Italy. One of the objectives of the Institute was the better control of plant diseases (Orton, 1914; Castonguay, 2010).

Scientists from different countries were very supportive of improving international cooperation. The American Phytopathological Society recognized the importance of this movement at a symposium on international phytopathology in 1912 and passed a resolution stating in part:

> Resolved, That the American Phytopathological Society, appreciating the fact that plant diseases do not heed national limits or geographical boundaries and also the evident limitations imposed upon investigations when restricted by national bounds, respectfully recommend that administrators of research institutions, whether state or national, as well as individual investigators recognize the importance of establishing closer international relations.

Although scientists led early efforts at international cooperation, there was a clear need for governments to be on board as well. Professor Cuboni suggested that the General Assembly of the International Institute of Agriculture adopt several recommendations with regard to phytosanitary inspections for moving plants in trade that stated:

> The general assembly recommends that the governments adhering to the institute:
>
> **1.** Organize, if they have not already done so, a government service of phytopathological inspection and control, especially for nurseries and establishments trading in living plants intended for reproduction.
> **2.** Enact that all consignments of plants intended for reproduction be accompanied by a certificate similar to that required by the Berne phylloxera convention to be delivered by the government inspector, certifying that said plant comes from a nursery subject to his control and free from dangerous cryptogamic or entomological disease.

The recommendations further called for an international agreement for the protection of agriculture against pests. The call for cooperation at the inter-governmental level was met when countries adopted the International Convention for the Protection of Plants, originally in 1914 and revised in 1929. However, the agreement was only weakly supported – world events from the 1920s through the Second World War kept countries from fully supporting the new international treaty for plant protection.

After the Second World War, there were renewed efforts for cooperation in international plant protection at the intergovernmental level. With the formation of the United Nations (UN) after the war, the Food and Agriculture Organization (FAO) of the UN was established in Rome, Italy – replacing the International Institute of Agriculture. Member countries of the FAO began drafting a new plant protection agreement – and in 1951 adopted the IPPC. This new agreement superseded all previous plant protection agreements (including the first international agreement for cooperation from 1878, International Convention on Measures to be Taken against *Phylloxera vastatrix*) (Castonguay, 2010). The IPPC was subsequently revised in 1979 and again in 1997 – it is covered in more detail in Chapter 4.

3.5. Modern Laws – Risk Analysis Becomes a Legal Obligation

Most major trading countries had enacted national plant protection laws by the first two decades of the 20th century. Risk and risk analysis were not explicit in those laws, though the management of risk was implicit because the laws were intended to prevent entry and spread of pests. However, several key events beginning after the Second World War would change the state of plant protection, and bring risk analysis to the foreground.

After the Second World War, countries were keen to begin economic recovery, and promoting increased trade between countries was seen as the best option for economic stability, and therefore lasting peace. Thus, in 1947 countries met in Seattle to negotiate what would become the General Agreements on Tariffs and Trade or the GATT (GATT, 1947).

The GATT was primarily aimed at reducing tariffs, duties and other barriers to trade. Agriculture, and trade in agricultural products were not explicitly mentioned, and the potential risks associated with such trade received little attention. However, it was recognized that there could be legitimate barriers to trade, and exceptions were noted in Article XX.b, which put in place measures designed to protect human, animal and plant health from the introduction and spread of diseases.

The effect of the GATT was to liberalize trade – countries could import and export a greater variety of goods, to and from many different origins. As the variety of products moving in trade increased and origins of products became more diverse, the potential risks for moving pests with these products also increased. This underscored the need for countries to be able to put in place protective measures to prevent the entry of pests. However, there were concerns that countries would use quarantine barriers (as noted in Article XX.b of the GATT) to protect domestic markets and prevent trade – that is, using quarantine measures arbitrarily and without justification.

In the 1980s, countries recognized the need to revise the GATT, and in 1986, undertook negotiations (called 'the Uruguay Round' of negotiations) that lasted almost 10 years. Unlike previous negotiations to the GATT, agriculture and trade in agricultural products were central to discussions – in particular with regard to market access, subsidies and SPS measures (or measures to protect human, animal or plant life or health). At that time, countries recognized that the SPS concepts inherent in Article XX.b (*necessary to protect human, animal or plant life or health*) needed greater guidance and discipline to prevent abuse (e.g. using quarantine measures as disguised barriers to trade). As a result, the Agreement on the Application of Sanitary and Phytosanitary Measures (or SPS Agreement) was negotiated as part of the revision of the GATT (FAO, 2000).

One of the major pillars of the SPS Agreement is that measures to protect human, animal or plant life or health must be based on scientific information, and must be technically justified. The technical justification could come in the form of an international standard, guideline or recommendation written by an international standard setting body (discussed in Chapter 4) *OR* in the form of a risk assessment. When the SPS Agreement entered into force in 1995, risk assessment as the basis for national laws and regulations for plant protection became an international obligation for all Member countries.

The SPS Agreement also identified standard setting bodies for human, animal and plant health – and as the IPPC already existed, it was identified as the standard setting body for plant health. However, the 1951 and 1979 texts of the IPPC did not include provision for the development of standards. Thus, the IPPC was revised to modernize the concepts and to align it with the new expectations placed upon it by the SPS Agreement. The 'New Revised Text of the IPPC' was adopted in 1997 – the revision established a Secretariat, a Commission on Phytosanitary Measures and a process for the development of international standards (FAO, 1997, 2000). The 1997 text of the IPPC remains in force today. More detail on the history of the development of the SPS agreement will be provided in Chapter 4.

3.6. Adoption of ISPM No. 2: *Guidelines for Pest Risk Analysis* (Currently *Framework for Pest Risk Analysis*)

It was clear that the SPS Agreement would create obligations for all Member countries who wanted to participate in trade – phytosanitary requirements had to be based on international standards or an assessment of risk. In 1991, an international meeting was held, 'International Approaches to Plant Pest Risk Analysis' (NAPPO, 1993). The objectives of the meeting were to improve approaches to pest risk analysis and to foster discussions to facilitate the development of a document that would ultimately form the basis for an international approach to pest risk analysis (i.e. an international standard). The meeting was spearheaded by regional plant protection organizations (see section below on regional plant protection organizations) and organized jointly by the Animal and Plant Health Inspection Service of the US Department of Agriculture (APHIS-USDA) and the North American Plant Protection Organization (NAPPO), and provided the first steps towards an international standard for risk analysis.

The IPPC had only just begun developing international standards, and one of the first standards developed was general guidance on risk analysis, demonstrating the high profile that risk analysis now had in plant protection. The original ISPM No. 2 (*Guidelines for Pest Risk Analysis*, revised in 2007 and now called *Framework for Pest Risk Analysis*) was endorsed by FAO in 1995 and published in 1996, just after the SPS Agreement entered into force, and even before the IPPC revision was completed.

3.6.1. ISPM No. 2 adopted – countries align their national procedures with international standards

Before the SPS Agreement, there was not a requirement for formal risk analysis as the basis for measures. Countries used various methods – mostly to assess risk for their own purposes, rather than as a means of providing justifications to trading partners. Pest risk analysis was slowly beginning to emerge as a discipline in its own right, and a few countries had implemented procedures for at least rudimentary analyses in the late 1980s.

In some cases, decisions were made based on past history and established relationships with trading partners, or on various types of 'decision sheets' that provided a minimum of information on pests, hosts and options for managing pests on different commodities. Very little specific guidance existed for countries on how to analyse risk associated with the movement of pests on commodities in trade, as now required by the SPS Agreement.

Immediately prior to the negotiation of the SPS Agreement, countries were developing their own national guidance on risk analysis for plant protection. By the early 1990s, most major trading countries had implemented the use of risk analysis as the basis for decision making but there was a lack of consensus or harmonization (see Chapter 4 for more on harmonization) on the specific steps that should be included in pest risk analysis. At the time, countries understood that consensus and harmonization would be essential, especially under the new global trading framework.

Subsequent to the adoption of ISPM No. 2, countries sought to align their national procedures to the requirements laid out in the newly agreed standard. Although the approaches were consistent with the standard, there was considerable variation in methods used. Countries like the USA, Canada, New Zealand and Australia implemented commodity-based approaches to risk analysis. Their guidelines were written so that a commodity could be analysed for the types of pests it might carry, depending on the specific origin and the level of processing of the commodity. Pests that are considered to be likely to follow the commodity in trade are analysed further to determine whether risk management is necessary to manage those pests.

Other countries have implemented pest-specific approaches to risk analysis. The European and Mediterranean Plant Protection Organization (EPPO) is a regional organization for plant protection in Europe. It has developed a pest risk analysis scheme that provides very specific guidance on analysing the risk associated with a single pest – taking into account any of the pathways that pest may move on (rather than examining a specific commodity or single pathway carrying several types of pests).

Although these represent two very different approaches to pest risk analysis, there are some common elements. Regardless of the approach (e.g. pest-specific or commodity) the vast majority of pest risk analyses currently rely, at least in part if not entirely, on 'qualitative' descriptions and ratings of likelihood and consequences in the analyses. Simply put, a 'qualitative' rating is a non-numerical, non-quantitative method to describe the relative level of a particular element of the analysis. For instance, a pest may be described to have a 'low' likelihood or probability of being detected, or 'high' environmental consequences. Such qualitative descriptions are a legitimate means of estimating risk, particularly when quantitative data are missing. Uncertainty is also described in qualitative terms, using ratings such as high, medium and low. Later chapters in this text will cover different methods for conducting risk analyses in depth.

3.6.2. A note about regional organizations and pest risk analysis

The IPPC recognizes several regional organizations for plant protection (or RPPOs) – RPPOs are inter-governmental organizations that function as coordinating bodies for NPPOs on a regional level. The functions of RPPOs included in the text of the IPPC (1997) include:

- Coordination and participation in activities among their NPPOs in order to promote and achieve the objectives of the IPPC.
- Cooperation among regions for promoting harmonized phytosanitary measures.
- Gathering and disseminating information, in particular in relation with the IPPC.
- Cooperation with the IPPC in developing and implementing international standards for phytosanitary measures.

Each RPPO has its own activities and programme, and most of the RPPOs develop their own regional standards for phytosanitary measures (or RSPMs). These RSPMs apply only to countries that are Members of the RPPO that adopts a given standard. Because of the importance of pest risk analysis, several RPPOs have also developed guidance on aspects of pest risk analysis in the form of RSPMs – some of these RSPMs pre-date the first IPPC standards on PRA, and were used in the development of ISPM No. 2. Other RSPMs on PRA came later, and are based on ISPM No. 2.

There are currently nine recognized RPPOs:

- Asia and Pacific Plant Protection Commission (APPPC; established in 1956);
- Comunidad Andina (CA; 1969);
- Comite de Sanidad Vegetal del Cono Sur (COSAVE; 1980);
- Caribbean Plant Protection Commission (CPPC; 1967);
- European and Mediterranean Plant Protection Organization (EPPO; 1951);
- Inter-African Phytosanitary Council (IAPSC; 1954);
- North American Plant Protection Organization (NAPPO; 1976);
- Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA; 1947);
- Pacific Plant Protection Organization (PPPO; 1995).

3.7. Summary

Although pest risk analysis is a relatively new discipline, countries have been managing the risks associated with pests for hundreds of years. In the past 150 years, countries began to cooperate internationally in managing pest risk with the aim to prevent the introduction and spread of important pests. At the same time, countries began to adopt laws and regulations at the national level to protect themselves from new pests. More recently, international treaties, like the SPS Agreement and the IPPC have been adopted to provide a framework for how countries should implement national laws and regulations related to managing the risks associated with foreign pests. Those agreements include obligations for countries to technically justify their measures through risk analysis. Thus, risk analysis has become the basis for national laws and regulations aimed at preventing the introduction and spread of new pests.

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