Session 1

PINE WILT DISEASE: GLOBAL ISSUES, TRADE AND ECONOMIC IMPACT

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SUMMARY

Pine wilt disease (PWD) is perhaps the most serious threat to pine forests worldwide. Since it´s discovery in the early XXth century by Japanese forest researchers, and the relationship with its causative agent, the pinewood nematode (PWN) *Bursaphelenchus xylophilus*, in the 1970s, PWD has wreaked havoc wherever it appears. Firstly in the Far East (Japan, China and Korea) and now, more recently in 1999, in the EU (Portugal).

The forest sector in Portugal plays a major role in the Portuguese economy with a 12% contribution to the industrial gross domestic product, 3.2% of the gross domestic product, 10% of foreign trade and 5% of national employment. Maritime pine (*Pinus pinaster*) is one of the most important pine productions, and industrial activity, such as the production of wood and resin, as well as coastal protection associated with sand dunes. Also, stone pine (*Pinus pinea*) plays an important role in the economy with a share derived from the exports of high-quality pineon seed. Thus, the tremendous economical and ecological impact of the introduction of a pest and pathogen such as the PWN, although as far as is known, the only species susceptible to the nematode is maritime pine.

Immediately following detection, the research team involved (Univ. Évora, INIAP) informed the national plant quarantine and forest authorities, which relayed the information to Brussels and the appropriate EU authorities. A task force (GANP), followed by a national program (PROLUNP) was established. Since then, national surveys have been taking place, involving MADRP (Ministry of Agriculture), the University of Évora and several private corporations (e.g. UNAC). Forest growers in the area are particularly interested and involved since the area owned by the growers organizations totals 700 000 ha, largely affected by PWD. Detection of the disease has led to serious consequences and restrictions regarding exploration

and commercialization of wood. A precautionary phytosanitary strip, 3 km-wide, has been recently (2007) established surrounding the affected area. The Portuguese government, through its national program PROLUNP, has been deeply involved since 1999, and in conjunction with the EU (Permanent Phytosanitary Committee, and FVO) and committed to controlling this nematode and the potential spread to the rest of the country and to the rest of the EU.

The global impact of the presence of *Bursaphelenchus xylophilus* or the threat of its introduction and the resulting pine wilt disease in forested areas in different parts of the world is of increasing concern economically. The concern is exacerbated by the prevailing debate on climate change and the putative impact this could have on the vulnerability of the world's pine forests to this disease. The scientific and regulatory approach taken in different jurisdictions to the threat of pine wilt disease varies from country to country depending on the perceived vulnerability of their pine forests to the disease and/or to the economic cost due to lost trade in wood products.

Much of the research surrounding pine wilt disease has been located in the northern hemisphere, especially in southern Europe and in the warmer, coastal, Asian countries. However, there is an increased focus on this problem also in those countries in the southern hemisphere where plantations of susceptible pine have been established over the years. The forestry sector in Australia and New Zealand are on "high alert" for this disease and are practicing strict quarantine procedures at all ports of entry for wood products. As well, there is heightened awareness, as there is worldwide, for the need to monitor wood packaging materials for all imported goods.

In carrying out the necessary monitoring and assessment of products for *B. xylophilus* and its vectors substantial costs are incurred especially when decisions have to be made rapidly and regardless of whether the outcome is positive or negative. Australia's response recently to the appearance of some dying pines in a plantation illustrated the high sensitivity of some countries to this disease. Some $200,000 was spent on the assessment in order to save a potential loss of millions of dollars to the disease. This rapid, co-ordinated response to the report was for naught, because once identified it was found not to be *B. xylophilus*. This illustrates the particular importance of taking the responsibility at all levels of management to

secure the site and the need of a rapid, reliable diagnostic method for small nematode samples for use in the field.

Australia is particularly concerned about the vulnerability of its 1million hectares of planted forests, 80% of which are *Pinus* species, to attack from incursions of one or more species of the insect vector. *Monochamus alternatus* incursions in wood pallets have been reported from Brisbane, Queensland. The climate of this part of Australia is such that the *Pinus* plantations are particularly vulnerable to the potential outcome of such incursions, and the state of Queensland is developing a risk management strategy and a proactive breeding programme in response to this putative threat.

New Zealand has 1.6 million hectares of planted forests and 89% of the commercial forest is *Pinus radiata*. Although the climate where these forests are located tends to be somewhat cooler than that in Australia the potential for establishment and development of the disease in that country is believed to be high. The passage alone of 200,000 m^3/year of wood packaging through New Zealand ports is itself sufficient to require response. The potential incursion of insect vectors of pinewood nematode through the port system is regarded as high and is monitored carefully.

The enormous expansion of global trade and the continued use of unprocessed/inadequately-processed wood for packaging purposes is a challenge for all trading nations as such wood packaging material often harbours disease or pest species. The extent of this problem is readily illustrated by the expanding economies and exports of countries in south-east Asia. China. Japan and Korea have significant areas of forestland infested with *B. xylophilus*. These countries too are among the largest exporting countries of manufactured goods. Despite the attempts of authorities to ensure that only properly treated wood is used in the crating and packaging of goods *B. xylophilus* and/or its insect vector infested materials is being recorded at ports worldwide. This reminds us, therefore, of the ease with which this nematode pest can gain access to forest lands in new geographic locations through inappropriate use, treatment or monitoring of wood products. It especially highlights the necessity to find an alternative to using low-grade lumber for packaging purposes.

Lest we should believe that all wood products are always carriers of *B. xylophilus* and its vectors, it should be remembered that international trade of all kinds has occurred for

thousands of years and that lumber-born pests and diseases do not have worldwide distribution. Other physico-biological factors have a significant role in the occurrence, establishment and sustainability of a disease. The question is often raised as to why the whole of southern Europe doesn't already have *B. xylophilus* and pine wilt disease. European countries have traded with countries that are infested with *B. xylophilus* for hundreds of years. Turkey is an example of a country that appears to be highly vulnerable to pine wilt disease due to its extensive forests in the warm, southern region where the vector, *Monochamus galloprovincialis*, occurs. However, there is no record of the presence of *B. xylophilus* occurring there despite the importation of substantial quantities of wood from several countries

In many respects, Portugal illustrates both the challenge and the dilemma. In recent times *B. xylophilus* was discovered there in the warm coastal region. The research, administrative and quarantine authorities responded rapidly and *B. xylophilus* appears to have been confined to the region in which it was found. The rapid response would seem to have "saved the day" for Portugal. Nevertheless, it raises again the long-standing questions, how long had *B. xylophilus* been in Portugal before it was found? If Lisbon was the port of entry, which seems very likely, why had *B. xylophilus* not entered Lisbon many years earlier and established populations and the pine wilt disease? Will the infestation in Portugal be sustainable and will it spread or will it die out within a few years? We still do not have sufficient understanding of the biology of this pest to know the answers to these questions.