The world threat of Xylella fastidiosa

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The world threat of *Xylella fastidiosa*

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Xylella fastidiosa is a xylem-limited, fastidious bacterium, considered as quarantine organism in many countries. It was mainly present in America but it has been recently identified in Italy in 2013 (Saponari *et.al.*, 2013) and in France in 2015 (EPPO, 2015). Its economic importance is due to several characteristics of this pathogen and to the disease it causes (Janse, J.D., Obradovic, A. 2010): 1) the large number of hosts (359 potential hosts according to EFSA, 2015a, and new plant hosts are discovered every year), the severe symptoms induced (mainly leaf scorch, wilting, dieback and decline); 2) the different diseases it causes in economically important plants (Pierce's disease on grapevine, citrus variegated chlorosis, plum leaf scald, almond leaf scorch, olive quick decline syndrome, etc.); 3) the long list of xylem sap-sucking vectors (among the local *Homoptera*, *Cicadellidae* and *Cercopidae* present in the different countries), the absence of latent period in the transmission, meaning that bacteria are persistently transmitted once the adult vector has acquired the pathogen, and 4) the very difficult and expensive chemical or integrated control (of the vectors and the disease). In addition, resistant varieties of commercial interest are not yet available for the most important hosts. Consequently, exclusion, eradication or contention are the main management options when the bacterium is identified in a new area (EFSA, 2015b).

X. fastidiosa has six subspecies that have been reported as causing symptoms in a more or less high number of hosts but its epidemiology is not well known in most of them, with the exception of Pierce's disease and olive quick decline syndrome. The bacterium can adapt to different climatic conditions although low winter temperatures (below -8ºC annual minimum temperature) limits its dissemination. Symptoms are mainly shown in late spring, summer and early autumn and they are favoured by high temperatures (25-28ºC) and stressed conditions for the crop. The bacterium is present in roots and the aerial parts and forms biofilms in the plant vessels, making water and nutrient transport difficult and favouring symptoms appearance.

The unexpected discovery of *X. fastidiosa* in Italy in 2013 and in France in 2015 has made more evident the risk that this pathogen represents not only for European commercial crops, landscape trees and ornamentals, but also for agriculture in other continents. The available information suggests that the CoDiRO strain detected in olive in Italy could have been introduced there with ornamental plants imported from Costa Rica. In addition, there have been many interceptions since 2014 in the inspections performed in several borders of the European Union in coffee plants but also in other ornamentals imported from Costa Rica, Honduras, Ecuador and Mexico by Austria, France, Italy, Germany, Slovakia and The Netherlands.

This demonstrates, once more, that the uncontrolled global market could lead to a global dissemination of some quarantine organisms. The Italian outbreak is the paradigm of how the plant pathogenic bacteria have been able to overcome the European Union legislation that protects the international trade without taking into account the phytosanitary risks.

However, the European Union has reacted fast against this pathogen, published several Commission Decisions in 2014, 2015 and 2016 and drastic controls have been implemented to avoid the introduction of contaminated plants in its territory. However, the European Union (and probably many other countries) have imported in the last ten years a large number of plants of *X. fastidiosa* hosts, from areas where the bacterium was present and the plants were not specifically analyzed for this pathogen. As an example, there were more than 35000 t of potted

plants imported every year since 2010 to 2014 from Costa Rica, Guatemala, Honduras and other countries where this pathogen is present that were not analyzed. Unfortunately, in the majority of the countries, the phytosanitary certificates for export are provided without any analysis against *X. fastidiosa*, just after visual inspection of the plants. It is now clear that the detection in asymptomatic plants is essential, because this bacterium can have a long period of latency in the host, or even does not show symptoms in some contaminated plants. In this context, the European and Mediterranean Plant Protection Organization (EPPO) has published very useful inspection and diagnostic protocols (EPPO, 2016).

Bacteria and vectors are not limited by borders and common actions and collaborative practical work are necessary. As *X. fastidiosa* in Italy is a threatening phytosanitary emergency (Martelli *et al.*, 2015) and the bacterium has demonstrated to be a world threat, each country should prepare its own risk assessment for this pathogen, design a contingency plan in different scenarios and be ready for a rapid eradication of an eventual introduction. The governments, Plant Protection services, phytosanitary inspectors, laboratories of diagnostic, nurserymen, growers, mass media and the public in general should know the *Xylella* issues, identify the regional and local risks and take complementary preventive actions against this pathogen because unfortunately, new outbreaks could be detected and all the countries should be well prepared for dealing with this serious problem.

Note. In 2016-2017 *X. fastidiosa* has also been reported in a greenhouse in Germany and in three Balearic islands in Spain.

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