



## Forest pathogens under plant quarantine regulations in Turkey

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**Abstract:** Quarantine pests and diseases are harmful organisms, defined under legislation. We addressed the harmful organisms that are capable to cause disease on forest plants and listed for regulation as quarantine pests in regulation on plant quarantine of Turkey and by EPPO (European and Mediterranean Plant Protection Organisation). We also examined the fungi listed under a recent regulation entered into force in 2016 in order to regulate the authorization of marketing the plant propagative materials and Phytosanitary Certificates only for forest plants. A remarkable number of harmful fungal organisms take place under legislations as quarantine pests causing diseases on forest trees or other plants in forests. More than half (52%) of the harmful fungal organisms listed in the EPPO's A1 list (absent in EPPO region, including Turkey) are either directly causing disease on forest trees and on fruit trees in orchards or pose threat to wild hosts in forests. On the other hand, according to the current regulation on plant quarantine in Turkey (Annexes 1-A and 2-A), a total of 32 fungi were recommended for regulation as absent in the country, among which 73% (19 fungi) are capable of causing diseases on forest trees or pose threat to other plants in forests. The number of fungal pathogens present in EPPO region but not in Turkey according to these lists were 17. *Phytophthora ramorum* and *Fusarium circinatum* are among very destructive forest pathogens reported from Europe but not from Turkey. However, some of the organisms listed in EPPO A1 list were not accounted in the Turkish plant quarantine regulation; for example, the fungal causal agent of thousand canker disease of Walnuts (*Juglans* spp.) *Geosmithia morbida* which recently detected within EPPO region (Italy). On the other hand, some harmful fungal pathogens not listed in currently in EPPO, but present almost all around Europe, such as *Hymenoscyphus fraxineus*, the causal agent of destructive Ash dieback disease, is not included as a harmful organism in the Turkish regulation even though not present in Turkey but pose high risk for forestry. Another drawback in the current legislations is the usage of synonyms of the organisms which also lead to repetitive listing of the same fungus in different categories (i.e. both in annex 2A as absent in county and in annex 2B as present). Interestingly, the recent regulation for authorization of marketing the plant propagative materials and phytosanitary certificates for forest plants also doesn't include, for example, the above mentioned dangerous forest pathogens, even though the regulation meant to regulate marketing of propagative materials used in forestry. Nevertheless, this regulation also lists some plant pathogens such as *Ophiostoma ulmi* and *O. novo-ulmi* in the list of harmful organisms that are not present in Turkey. However, the presence of Dutch elm disease caused by *O. ulmi* and *O. novo-ulmi* is known in Turkey since 1940s and 2000s respectively. As fungi are the main disease agents of forest trees or shrubs, in this review we focused on the harmful fungal organisms. However, there are also a number of nematodes, viruses, prokaryotes and parasitic plants which also can cause disease in forest plants and pose important risk to forests. For example, *Xylella fastidiosa* is one of the most dangerous plant bacteria worldwide, causing a variety of diseases on woody plants including elms, oaks and many other forest trees. A revision for the harmful organisms especially those capable to cause disease on forests trees or on other forest plants listed in legislations is definitely needed. Especially the forestry authorizations should consider the high risks posed by this organism and be more careful while planning new legislations. While our study revealed some drawbacks on current regulations but only on fungal pathogens, a comprehensive revision on the lists for all harmful organisms as well as plant products would provide a wider opinion on requirements.

**Keywords:** Plant quarantine, harmful organisms, forest pathogens, Turkey