Evaluating the Threat Posed by Fungi on the APHIS List of Regulated Plant Pests


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Drs. Erica Cline and David Farr recently reviewed the fungi on the APHIS Regulated Plant Pest List, providing an accurate scientific name as well as the disease, plant hosts, and geographic distribution for each species. In presenting these data they remained neutral on which of these fungi pose a threat to U.S. agriculture and forest resources because such an evaluation was beyond the scope of that project. However, the purpose of such a document is so that someone or some organization can do just that — evaluate the threat posed by these fungi. Once the fungi that threaten U.S. agriculture are known, activities can be directed at preventing the entry of those organisms.

An evaluation of the potential threat of fungi on the APHIS Regulated Plant Pest List was conducted by the federal interagency Invasive Terrestrial Arthropods and Pathogens (ITAP) Subcommittee on Plant Pathogens using the data provided in Cline and Farr (1). Each species was evaluated based on the importance of the plant host, geographic distribution, and state of knowledge. Fungi that cause serious diseases of plants of major economic value and forest trees were considered a threat if the fungus does not occur in the United States. Similarly, fungi that cause serious diseases of plants of horticultural importance or of crops of minor economic importance and do not occur in the United States were placed in the second category. The first two categories could be considered comparable in the need to exclude these fungal pathogens. If the species is reported more than once in the United States and these reports are in the literature or backed by voucher specimens, the species is considered to be established in the United States. Some fungal pathogens occur on crops that are not grown in the United States but are important to the U.S. economy. For some fungi not enough is known to make an evaluation; in fact, some species have not been seen since their original description often decades ago. The pathogens are divided into the following groups.
Threat to Major Crop Plants and Forest Trees

*Chrysomyxa abietis* on *Picea*; Europe, Asia

*Chrysomyxa himalensis* on *Picea* and *Rhododendron*; Asia

*Chrysomyxa rhododendri* on *Picea* and *Rhododendron* (telial state already in North America); Europe, Asia

*Cronartium flaccidum* (*Peridermium cornui*) on *Pinus* and alternative hosts; Europe, Asia

*Elsinoë australis* on citrus; South America

*Lachnellula willkommi* on larch (eradicated from North America); Asia, Europe

*Monilinia fructigena* on apples, pears, and peaches; Europe, Asia

*Cronartium flaccidum* on *Picea* and *Rhododendron*; Europe, Asia

*Peronosclerospora maydis* on corn; Asia, Australia, South America

*Peronosclerospora sacchari* on sugarcane; Asia, Australia, Central America

*Peronosclerospora philippinensis* on corn and other grasses (select agent); Asia, Africa

*Scerophthora rayssiae* var. *zeae* on corn (select agent), Asia

*Synchytrium endobioticum* on potato (eradicated from US, select agent); Europe, Asia, Africa, North America (Canada)

*Thekopsora areolata* on sweetpotato; Asia, Australia, South America

*Urocystis agropyri* on wheat (possibly in US); Europe, Asia, Africa, South America, Australia

Threat to Horticultural or Crop Plants of Minor Economic Importance

*Aecidium hydrangeae-paniculatae* (*Puccinia glyceriae*) on *Hydrangea* and *Glyceria*; Asia [*see Erratum]*.

*Aecidium mori* on mulberry; Asia

*Elsinoe batatas* on sweetpotato; Asia, Australia, Pacific Islands, Caribbean, South America

*Phialophora cinerescens* on carnation (reports in Canada, OR and CO questionable); Europe, Asia, South America, New Zealand

*Pseudocercospora timorensis* on sweetpotato; Asia, Australia, South America, Africa

*Puccinia gladioli* on gladiolus and *Valerianella* (aecial state in western US); Europe, Asia, Africa (Libya)

*Puccinia horiana* on chrysanthemum (outbreaks in US greenhouses eradicated); Europe, Asia, Australia, South America, Africa

*Pucciniastrum actinidiae* on kiwi; Asia

*Uromyces gladioli* on gladiolus and other Iridaceae; Africa, South America

*Uromyces transversalis* on gladiolus and other Iridaceae; Africa, Australia, South America, North America (Mexico), New Zealand

*Uromycladium tepperianum* on acacia

Already Established in the U.S.

*Allantophomopsis pseudotsugae* (*Phacidium coniferarum*) on conifers

*Ceratoctis fimbriata* on diverse crops and trees

*Entyloma oryzae* on rice

*Phytophthora fragariae* on strawberry

*Rossellinia necatrix* on grape, strawberry, apple, etc.

*Stigmina deflectans* on juniper (Canada, SD and WI)

*Urocystis tritici* on wheat
Threat to Crops Not Grown in U.S.

*Hemileia vastatrix* on coffee
*Moniliophthora perniciosa* on cacao
*Moniliophthora roreri* on cacao
*Oncobasidium theobromae* on cacao
*Trachysphaera fructigena* on cacao
*Uredo dioscoreae-alatae* on yam

Not Enough Known to Determine Threat

*Diaporthe mali* on apples
*Fusarium fuliginosporum* on cedar (known only from the type)
*Guignardia pyricola* on apples and pears
*Gymnosporangium asiatica* (*Roestelia koreensis*) on pear and juniper (in US based on old specimens, possible misidentifications)
*Melanoma glumarum* on rice
*Oospora oryzetorum* on rice (not a fungus)
*Pestalotia episeta* on banana
*Pseudoepicoccum tracheiphila* on grapes
*Puccinia mcelleanii* on gladiolus (known only from type)
*Rhacodiaella vitis* on grape (known only from type)
*Septoria melanosa* on grape (reported in North America?)
*Uredo gladioli-buettneri* on gladiolus (known only from type, lost)
*Uromyces nyikensis* on gladiolus (known only from type)
*Xylobolus hiugense* on oak (known only from type, not pathogenic)

Two genera of insect-associated fungi, specifically *Beauveria* spp. and *Entomophthora* spp. were included on the APHIS list but are not plant pests and thus are not discussed here.

Out of the 52 species listed, 25 of the fungi on the APHIS Regulated Plant Pest List fall into the first two groups, namely species that are a threat to American crop plants and forests or to horticultural plants or crops of minor economic importance. Attention should be paid to preventing the entry of these fungi. Interestingly, almost 60% of these are rust fungi. In synthesizing the geographic distribution of these fungi, all of these species occur in Asia except the two species of *Uromyces* on *Gladiolus*. It would appear that Asia serves as a source for pathogens that threaten U.S. agriculture although many occur elsewhere in the world as well especially in Europe where the fungi are more well-known. Many of these pathogens could enter the U.S. on nursery stock particularly those on horticultural crops. A number of these fungi occur on living forest trees. The cause of Karnal bunt, *Tilletia indica*, on wheat has a restricted distribution in the United States and Mexico as well as Asia and causes limited lost of quality. The fungal species about which not enough is known to determine if they are a threat should be the subject of research.

Literature Cited


*Erratum*

A correction was made to this line on May 17, 2006. Previously, Glyceria had been misspelled.