GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Ophiostoma ulmi sensu lato***

Ophiostoma ulmi sensu lato 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Fungi	Ascomycota	Ascomycetes	Ophiostomatales	Ophiostomataceae

Common name Schlauchpilz (German), dutch elm disease (English)

Synonym *Ceratocystis ulmi*

Similar species *Ceratocystis fagacearum*

Summary Dutch elm disease (DED) is a wilt disease caused by a pathogenic fungus disseminated by specialised bark beetles. There have been two destructive pandemics of the disease in Europe and North America during the last century, caused by the successive introduction of two fungal pathogens: Ophiostoma ulmi and Ophiostoma novo-ulmi, the latter much more aggressive. The vector is represented by bark beetles, various different species of scolyts living on elm trees. These beetles breed under the bark of dying elm trees. The young adults fly from the DED infected pupal chambers to feed on healthy elm trees. As a consequence, spores of the fungus carried on the bodies of these beetles are deposited in healthy plant tissue. Ophiostoma ulmi sensu lato can also spread via root grafts.

view this species on IUCN Red List

Species Description
According to Partridge (1997), *Ophiostoma ulmi* s.l. is a complex fungus. It has four spore types: conidia produced on mycelium, conidia borne on a mycelial stalk (synnema), yeast like spores that are variable in size, and ascospores, which are produced in a black fruiting body (perithecium) which ooze through the long neck of the perithecium, and accumulate at the tip in sticky mass.
Please see PaDIL (Pests and Diseases Image Library) Species Content Page *Fungi: Dutch elm disease*\r\n for high quality diagnostic and overview images

Notes
Ophiostoma ulmi s.l. was first discovered and studied in the Netherlands by seven women researchers, hence the name Dutch elm disease (Partridge, 1997).

Lifecycle Stages
Ophiostoma ulmi s.l. has three asexual phases: a yeast phase, a Sporothrix -like stage, and a Graphium stage (Anacker, 2001).

Habitat Description
Hosts: Host trees include all the Euro-American native elms as field elm (*Ulmus minor*), wych elm (*Ulmus glabra*), european white elm (*Ulmus laevis*), American elm (*Ulmus americana*), red or slippery elm (*Ulmus rubra*), rock elm (*Ulmus thomasii*), and cedar elm (*Ulmus crassifolia*). Asian elm species are generally much less susceptible than Euro-American native elms. The Chinese elm (*Ulmus parvifloia*) is occasionally infected by the disease but is much less susceptible than American elm. Vectors: *O. ulmi* is vectored by a number of bark beetles, the efficiency of which is dependant on thei body dimension. In America the main species are *Hylurgopinus rufipes*, the American elm bark beetle and *Scolytus multistriatus*, the introduced smaller European elm bark beetle, while in Europe the main vector is the large European bark beetle *Scolytus scolytus*, and *S. multistiatus*, *S. pygmaeus* and *S. kirschii* are also active (see also Webber, 2000).

General Impacts
Stack *et al*. (1996) notes that the observable symptoms and the progression of Dutch elm disease differs among trees that are inoculated through beetle feeding and those that are infected through root grafts. Trees infected by beetles first show wilting, curling and yellowing of leaves on one or more branches in the upper portion of the tree. Large trees may survive and show progressively more symptoms for one or more years. In addition, because of their position, the infections arising from native elm bark beetle inoculations have a head start in spreading through the tree. Frequently, by the time first symptoms are noted, the fungus has already reached scaffold branches or the main trunk of the tree. Once the fungus is established within a tree, it spreads rapidly *via* the water-conducting vessels. The tree forms gums within these vessels in response to the presence of the fungus, causing the tree to wilt and eventually die. Trees infected through root grafts wilt and die rapidly; this frequently occurs in the spring soon after the trees have leafed out and progresses from the base of the tree upward.

Management Info
Preventative measures: According to Stack *et al*. (1996), Dutch elm disease cannot be eliminated once it begins. A year-round community sanitation program is the key to slowing the spread of the disease. The most available control is removing infected trees and promptly destroying the wood. If infected wood is to be used as firewood, it should first be debarked. Trenching to disrupt root grafts is also recommended to protect healthy elm trees near diseased ones. In urban situations, insecticide spraying of high value trees has been effective in keeping bark beetles from attacking susceptible trees. In ornamental plantings, suggested control measures include planting trees further apart to prevent root grafts or choosing mixed tree species. The use of resistant selections for new plantations is strongly recommended.
The American Phytopathological Society (APS) offers on its website illustrated lessons to introduce the symptoms and signs, pathogen biology, disease cycle, epidemiology, disease management, and scientific, economic and social significance of major plant diseases. Please follow this link \r\n*Dutch elm disease* for details.

Pathway
Spores of the Dutch elm disease fungus are carried on the bodies of beetles and deposited in egg galleries and tree wounds (Stack *et al.*, 1996).

Principal source: Stack, R., McBride, D., Lamey, A.1996. Dutch Elm Disease. North Dakota State University.

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

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[1] AUSTRIA
[1] BES ISLANDS (BONAIRE, SINT EUSTATIUS AND SABA)
[1] CZECH REPUBLIC
[1] EX-YUGOSLAVIA
[1] FRANCE
[1] GREECE
[1] IRAN, ISLAMIC REPUBLIC OF
[1] JAPAN
[1] POLAND
[1] ROMANIA
[1] SWEDEN
[1] UNITED KINGDOM
[1] BELGIUM
[4] CANADA

[1] EUROPE
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[1] ITALY
[1] NEW ZEALAND
[1] PORTUGAL
[1] SPAIN
[1] SWITZERLAND
[14] UNITED STATES

BIBLIOGRAPHY

10 references found for **Ophiostoma ulmi sensu lato**

Managment information

D'Arcy, C.J.. 2000. Dutch elm disease. The Plant Health Instructor. DOI: 10.1094/PHI-I-2000-0721-02 Revised, 2005.
Summary: The American Phytopathological Society (APS) offers on its website illustrated lessons to introduce the symptoms and signs, pathogen biology, disease cycle, epidemiology, disease management, and scientific, economic and social significance of major plant diseases. The website will also offer basic information on the history, biology, survival, dissemination, host-parasite interactions, epidemiology and management of the major groups of plant pathogens. This section is in development.
APS Introductory Plant Pathology Resources is available from http://www.apsnet.org/education/IntroPlantPath/top.html. This page is available from: http://www.apsnet.org/education/LessonsPlantPath/DutchElm/default.htm [Accessed 7 November 2006]

Liberato J R, Scott Cameron R, Dick M A & Inglis C 2006. Dutch elm disease (*Ophiostoma*) Pest and Diseases Image Library. Updated on 29/09/2006 6:02:23 PM.
Summary: Available from: http://www.padil.gov.au/pests-and-diseases/Pest/Main/136624 [Accessed 7 December 2011]

MAF (Ministry of Agriculture and Forestry)/Biosecurity New Zealand, 2008. Dutch Elm Disease *Ophiostoma ulmi*
Summary: Available from: http://www.biosecurity.govt.nz/pests/dutch-elm-disease [Accessed 18 March 2010]

Stack, R., McBride, D., Lamey, A.1996. *Dutch Elm Disease.* North Dakota State University.
Summary: An extensive report on the biology, ecology, distribution and prevention of Dutch Elm Disease.
Available from: http://www.ext.nodak.edu/extpubs/plantsci/trees/pp324w.htm [Accessed 21 May 2003].

General information

Anacker, B. 2001. *Microascales.* University of Wisconsin.
Summary: A detailed report on the order Microascales and the species it includes. *Ophiostoma ulmi* is among these species. The report has background information on *O. ulmi* and photos.

Bernard, B. 2000. *Dutch Elm Disease.* NC State University.
Summary: A report that includes the European countries that are affected by Dutch Elm disease.

Masuya, H; C. Brasier; Y. Ichihara; T. Kubono and N. Kanzaki. 2009. First report of the Dutch elm disease pathogens *Ophiostoma ulmi* and *O. novo-ulmi* in Japan. BSPP New Disease Reports
Summary: Available from: http://www.bspp.org.uk/publications/new-disease-reports/ndr.php?id=020006 [Accessed 18 March 2010]

Palm, E., Craig, W. 1999. *Dutch Elm Disease in Missouri.* University of Missouri.
Summary: A report on Dutch Elm Disease in Missouri and throughout the U.S.

Partridge, J. 1997. *Dutch elm disease.* University of Nebraska-Lincoln.
Summary: A website that contains information on Dutch elm disease. It includes helpful links and illustrations.

PMI (Pest Management Services) 2003. *Dutch elm disease.* City of Edmonton.
Summary: A short summary on the spread of Dutch elm disease to Canada.