

### Mini data sheet on *Phakopsora pachyrhizi*

Added in 2005 - Deleted in 2009

**Reasons for deletion:**

The pest *Phakopsora pachyrhizi* has been included in EPPO Alert List for more than 3 years and during this period no particular international action was requested by the EPPO member countries. In 2009, it was therefore considered that sufficient alert has been given and the pest was deleted from the Alert List.

*Phakopsora pachyrhizi* (Asian soybean rust)

Why	The recent and rapid spread of <i>Phakopsora pachyrhizi</i> in the Americas attracted our attention. Although data is lacking on potential establishment in the Euro-Mediterranean region (tropical and sub-tropical pathogen), the EPPO Secretariat decided to add it to the EPPO Alert List.
Where	<p><b>Asia:</b> Cambodia, China, India, Indonesia, Japan, Korea, Malaysia, Nepal, Philippines, Russia (Far East), Taiwan, Thailand, Vietnam.</p> <p><b>Africa:</b> Ghana, Mozambique, Nigeria, Rwanda, Sierra Leone, South Africa, Uganda, Zambia, Zimbabwe.</p> <p><b>North America:</b> Mexico (San Luis Potosi, Tamaulipas, Veracruz), USA (Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Hawaii, Louisiana, Mississippi, Missouri, Nebraska, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia).</p> <p><b>South America:</b> Argentina, Bolivia, Brazil (Goias, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Rio Grande do Sul, São Paulo), Paraguay, Uruguay.</p> <p><b>Oceania:</b> Australia, Papua New Guinea.</p>
On which plants	Soybean ( <i>Glycine max</i> ) is the main cultivated host but many other Fabaceae can host this rust, for example: <i>Lupinus hirsutus</i> , <i>Medicago arborea</i> , <i>Melilotus officinalis</i> , <i>Phaseolus vulgaris</i> , <i>P. lunatus</i> , <i>Vicia dasycarpa</i> , <i>Vigna unguiculata</i> , and weeds such as: <i>Desmodium tortuosum</i> , <i>Pueraria montana</i> var. <i>lobata</i> (kudzu). More data is needed on the range and economic importance of <i>P. pachyrhizi</i> on legume hosts, other than soybean.
Damage	The most common symptoms of infection by <i>P. pachyrhizi</i> are tan-to-dark brown or reddish brown lesions (2 to 5 mm <sup>2</sup> ) which are usually clustered along the veins. Lesions contain erumpent, globose uredinia. Urediniospores are released through the circular ostiole. The disease begins with small, water-soaked lesions, which gradually increase in size, turning from grey to tan or brown. They assume a polygonal shape restricted by leaf veins and usually coalesce to form larger lesions. As the plant matures and sets pods, the symptoms spread rapidly to the middle and upper parts of the plant. Lesions are found on petioles, pods, and stems but are most abundant on leaves. As rust severity increases, premature defoliation and early maturation of plants is common. In areas where the pathogen occurs commonly, yield losses up to 80% have been reported. Successful infection is dependent on the availability of moisture on plant surfaces. At least 6 h of free moisture is needed for infection with maximum infections occurring with 10 to 12 h of free moisture. Temperatures between 15 and 28°C are ideal for infection.
Dissemination	Over long distances, <i>P. pachyrhizi</i> is mainly spread by wind-borne spores (e.g. in USA, it is considered that Hurricane Ivan transported it from South America to Southern USA, see Internet animation <a href="https://netfiles.uiuc.edu/ariatti/www/SBR/Ivan.htm">https://netfiles.uiuc.edu/ariatti/www/SBR/Ivan.htm</a> ). Trade of host plants cannot be excluded as a pathway (e.g. leafy vegetables, ornamentals, pods).
Pathway	Plants for planting, ornamental cut foliage, vegetables of host plants may ensure dissemination of the pathogen.

Possible risks	Soybean is an important crop in the EPPO region. <i>P. pachyrhizi</i> is considered as a serious rust disease in countries where it occurs. Control methods are available (chemical control, destruction of weed hosts) but more data is needed on their efficacy. Preliminary CLIMEX studies have showed that low winter temperatures and lack of humidity are limiting factors for the establishment of the pathogen, and therefore in Europe, only Southern Mediterranean countries may be at risk. However, more detailed studies on its potential for establishment would be needed for the EPPO region.
Source(s)	<p>Gupta VP, Kaur A (2004) <i>Phakopsora pachyrhizi</i> - soybean rust pathogen new to Rajasthan. <i>Journal of Mycology and Plant Pathology</i> 34(1), p 151 (abst.).</p> <p>Klag N (2005) Soybean Rust. NAPPO Newsletter, March, p 4.</p> <p>Lynch TN, Marois JJ, Wright DL, Harmon PF, Harmon CL, Miles MR (2006) First report of soybean rust caused by <i>Phakopsora pachyrhizi</i> on <i>Phaseolus</i> spp. in the United States. <i>Plant Disease</i> 90(7), p 970.</p> <p>Pivonia S, Yang XB (2004) Assessment of the potential year-round establishment of soybean rust throughout the World. <i>Plant Disease</i>, 88(5), 523-529.</p> <p>Sconyers LE, Kemerait RC Jr, Brock JH, Gitaitis RD, Sanders FH, Phillips DV, Jost PH (2006) First report of <i>Phakopsora pachyrhizi</i>, the causal agent of soybean rust, on beggarweed in the United States. <i>Plant Disease</i> 90(7), p 972.</p> <p>Yorinori JT, Nunes Junior J, Lazzarotta JJ (2004) [Asiatic rust of soybeans in Brazil: evolution, economic importance and control.] <i>Documentos - Embrapa Soja</i> no. 247, 63 pp (abst.).</p> <p>INTERNET</p> <p>NAPPO Pest Alert System - Official Pest Reports (2006-02-16) Detection of soybean rust (<i>Phakopsora pachyrhizi</i>) in the states of Tamaulipas and San Luis Potosi, Mexico. <a href="http://www.pestalert.org/oprDetail.cfm?oprID=192">http://www.pestalert.org/oprDetail.cfm?oprID=192</a></p> <p>NAPPO Pest Alert System. Official Pest Reports (2007-07-12) Detection of Asian soybean rust (<i>Phakopsora pachyrhizi</i>) in yam bean crops in Papantla, Veracruz, Mexico. <a href="http://www.pestalert.org/oprDetail_print.cfm?oprID=267">http://www.pestalert.org/oprDetail_print.cfm?oprID=267</a></p> <p>ProMed postings. <a href="http://www.promedmail.org">http://www.promedmail.org</a></p> <p>Soybean rust - USA: 1<sup>st</sup> report (2004-11)</p> <p>Soybean rust, Asian strain - Arkansas: 1<sup>st</sup> report (2004-11).</p> <p>Soybean rust, Asian strain - Brazil (2004-12).</p> <p>Soybean rust, Asian strain - Argentina (2005-01).</p> <p>Soybean rust, Asian strain - USA (Florida) : 1<sup>st</sup> report 2005 (2005-03).</p> <p>Soybean rust - Mexico (02) (2006-05-25)</p> <p>Purdue University. Plant and Pest Diagnostic Laboratory. Asian soybean rust. <i>Phakopsora pachyrhizi</i>. <a href="http://www.ppdl.purdue.edu/PPDL/soybean_rust.html">http://www.ppdl.purdue.edu/PPDL/soybean_rust.html</a></p> <p>USDA-APHIS. Pest Alert. Soybean Rust. <a href="http://www.aphis.usda.gov/ppq/ep/soybean_rust/">http://www.aphis.usda.gov/ppq/ep/soybean_rust/</a></p> <p>USDA Soybean rust information site. <a href="http://www.sbrusa.net/">http://www.sbrusa.net/</a></p> <p>USDA - Integrated Pest Management - Pest Information Platform for Extension and Education. <a href="http://www.sbrusa.net/cgi-bin/sbr/public.cgi">http://www.sbrusa.net/cgi-bin/sbr/public.cgi</a></p> <p>Plant Management Network. Soybean Rust. <a href="http://www.plantmanagementnetwork.org/infocenter/topic/soybeanrust/">http://www.plantmanagementnetwork.org/infocenter/topic/soybeanrust/</a></p>
EPPO RS 2005/029, Panel review date	<p>2006/076, 2006/200, 2006/230, 2007/187, 2008/057</p> <p>2009-02</p>
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