SCIENTIFIC OPINION

EFSA Journal

ADOPTED: 27 September 2018

doi: 10.2903/j.efsa.2018.5441

Pest categorisation of *Stagonosporopsis andigena*

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Abstract

The Panel on Plant Health performed a pest categorisation of *Stagonosporopsis andigena*, the causal agent of black blight of potato, for the EU. The pest is a well-defined fungal species and reliable methods exist for its detection and identification. *S. andigena* is present in Bolivia and Peru. The pest is not known to occur in the EU and is listed in Annex IAI of Directive 2000/29/EC as *Phoma andina*, meaning its introduction into the EU is prohibited. The major cultivated host is *Solanum tuberosum* (potato); other tuber-forming *Solanum* species and wild solanaceous plants are also affected. All hosts and pathways of entry of the pest into the EU are currently regulated. Host availability and climate matching suggest that *S. andigena* could establish in parts of the EU and further spread mainly by human-assisted means. The pest affects leaves, stems and petioles of potato plants causing lesions and premature leaf drop but not the underground parts, including tubers. The disease causes yield reductions up to 80%, depending on the susceptibility of potato cultivars. Early application of fungicide sprays and cultivation of resistant potato cultivars are the most effective measures for disease management. The pest introduction in the EU would potentially cause impacts to potato production. The main uncertainties concern the host range, the maximum period the pest survives on host debris in soil, the maximum distance over which conidia of the pest could be dispersed by wind-blown rain, and the magnitude of potential impacts to the EU. *S. andigena* meets all the criteria assessed by EFSA for consideration as potential Union quarantine pest. The criteria for considering *S. andigena* as a potential Union regulated non-quarantine pest are not met, since the pest is not known to occur in the EU.

Keywords: Black blight of potato, European Union, *Phoma andina*, Phoma leaf spot, quarantine, *Solanum tuberosum*

Requestor: European Commission

Question number: EFSA-Q-2018-00016

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Suggested citation: EFSA Panel on Plant Health (PLH), Bragard C, Dehnen-Schmutz K, Di Serio F, Gonthier P, Jacques M-A, Jaques Miret JA, Justesen AF, MacLeod A, Sven Magnusson C, Milonas P, Navas-Cortes JA, Parnell S, Potting R, Reignault PL, Thulke H-H, Van der Werf W, Yuen J, Zappalà L, Rossi V, Vloutoglou I, Bottex B and Vicent Civera A, 2018. Scientific Opinion on the pest categorisation of *Stagonosporopsis andigena.* EFSA Journal 2018;16(10):5441, 25 pp. https://doi.org/10.2903/j.efsa.2018.5441

ISSN: 1831-4732

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1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

1.1.1. Background

Council Directive 2000/29/EC[1] on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community establishes the present European Union plant health regime. The Directive lays down the phytosanitary provisions and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union. In the Directive's 2000/29/EC annexes, the list of harmful organisms (pests) whose introduction into or spread within the Union is prohibited, is detailed together with specific requirements for import or internal movement.

Following the evaluation of the plant health regime, the new basic plant health law, Regulation (EU) 2016/2031[2] on protective measures against pests of plants, was adopted on 26 October 2016 and will apply from 14 December 2019 onwards, repealing Directive 2000/29/EC. In line with the principles of the above mentioned legislation and the follow-up work of the secondary legislation for the listing of EU regulated pests, EFSA is requested to provide pest categorizations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/pest categorisation is not available.

1.1.2. Terms of reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002,[3] to provide scientific opinion in the field of plant health.

EFSA is requested to prepare and deliver a pest categorisation (step 1 analysis) for each of the regulated pests included in the appendices of the annex to this mandate. The methodology and template of pest categorisation have already been developed in past mandates for the organisms listed in Annex II Part A Section II of Directive 2000/29/EC. The same methodology and outcome is expected for this work as well.

The list of the harmful organisms included in the annex to this mandate comprises 133 harmful organisms or groups. A pest categorisation is expected for these 133 pests or groups and the delivery of the work would be stepwise at regular intervals through the year as detailed below. First priority covers the harmful organisms included in Appendix 1, comprising pests from Annex II Part A Section I and Annex II Part B of Directive 2000/29/EC. The delivery of all pest categorisations for the pests included in Appendix 1 is June 2018. The second priority is the pests included in Appendix 2, comprising the group of *Cicadellidae* (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), the group of *Tephritidae* (non-EU), the group of potato viruses and virus-like organisms, the group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.. and the group of *Margarodes* (non-EU species). The delivery of all pest categorisations for the pests included in Appendix 2 is end 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pest categorisations should be delivered by end 2020.

For the above mentioned groups, each covering a large number of pests, the pest categorisation will be performed for the group and not the individual harmful organisms listed under "such as" notation in the Annexes of the Directive 2000/29/EC. The criteria to be taken particularly under consideration for these cases, is the analysis of host pest combination, investigation of pathways, the damages occurring and the relevant impact.

Finally, as indicated in the text above, all references to 'non-European' should be avoided and replaced by 'non-EU' and refer to all territories with exception of the Union territories as defined in Article 1 point 3 of Regulation (EU) 2016/2031.

[1] Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169/1, 10.7.2000, p. 1–112.

[2] Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants. OJ L 317, 23.11.2016, p. 4–104.

[3] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31/1, 1.2.2002, p. 1–24.

1.1.2.1. Terms of Reference: Appendix 1

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Aleurocantus spp.
Anthonomus bisignifer (Schenkling)
Anthonomus signatus (Say)
Aschistonyx eppoi Inouye
Carposina niponensis Walsingham
Enarmonia packardi (Zeller)
Enarmonia prunivora Walsh
Grapholita inopinata Heinrich
Hishomonus phycitis
Leucaspis japonica Ckll.
Listronotus bonariensis (Kuschel)
Numonia pyrivorella (Matsumura)
Oligonychus perditus Pritchard and Baker
Pissodes spp. (non-EU)
Scirtothrips aurantii Faure
Scirtothrips citri (Moultex)
Scolytidae spp. (non-EU)
Scrobipalpopsis solanivora Povolny
Tachypterellus quadrigibbus Say
Toxoptera citricida Kirk.
Unaspis citri Comstock

(b) Bacteria

Citrus variegated chlorosis
Erwinia stewartii (Smith) Dye
Xanthomonas campestris pv. *oryzae* (Ishiyama) Dye and pv. *oryzicola* (Fang. et al.) Dye

(c) Fungi

Alternaria alternata (Fr.) Keissler (non-EU pathogenic isolates)
Anisogramma anomala (Peck) E. Müller
Apiosporina morbosa (Schwein.) v. Arx
Ceratocystis virescens (Davidson) Moreau
Cercoseptoria pini-densiflorae (Hori and Nambu) Deighton
Cercospora angolensis Carv. and Mendes
Elsinoe spp. Bitanc. and Jenk. Mendes
Fusarium oxysporum f. sp. *albedinis* (Kilian and Maire) Gordon
Guignardia piricola (Nosa) Yamamoto
Puccinia pittieriana Hennings
Stegophora ulmea (Schweinitz: Fries) Sydow & Sydow
Venturia nashicola Tanaka and Yamamoto

(d) Virus and virus-like organisms

Beet curly top virus (non-EU isolates)
Black raspberry latent virus
Blight and blight-like
Cadang-Cadang viroid
Citrus tristeza virus (non-EU isolates)
Leprosis
Little cherry pathogen (non- EU isolates)
Naturally spreading psorosis
Palm lethal yellowing mycoplasm
Satsuma dwarf virus
Tatter leaf virus
Witches' broom (MLO)

Annex IIB

(a) Insect mites and nematodes, at all stages of their development

Anthonomus grandis (Boh.)
Cephalcia lariciphila (Klug)
Dendroctonus micans Kugelan
Gilphinia hercyniae (Hartig)
Gonipterus scutellatus Gyll.
Ips amitinus Eichhof
Ips cembrae Heer
Ips duplicatus Sahlberg
Ips sexdentatus Börner
Ips typographus Heer
Sternochetus mangiferae Fabricius

(b) Bacteria

Curtobacterium flaccumfaciens pv. flaccumfaciens (Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton
Gremmeniella abietina (Lag.) Morelet
Hypoxylon mammatum (Wahl.) J. Miller

1.1.2.2. Terms of Reference: Appendix 2

List of harmful organisms for which pest categorisation is requested per group. The list below follows the categorisation included in the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

Group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), such as:

1) *Carneocephala fulgida* Nottingham
2) *Draeculacephala minerva* Ball
3) *Graphocephala atropunctata* (Signoret)

Group of Tephritidae (non-EU) such as:

1) *Anastrepha fraterculus* (Wiedemann)
2) *Anastrepha ludens* (Loew)
3) *Anastrepha obliqua* Macquart
4) *Anastrepha suspensa* (Loew)
5) *Dacus ciliatus* Loew
6) *Dacus curcurbitae* Coquillet
7) *Dacus dorsalis* Hendel
8) *Dacus tryoni* (Froggatt)
9) *Dacus tsuneonis* Miyake
10) *Dacus zonatus* Saund.
11) *Epochra canadensis* (Loew)
12) *Pardalaspis cyanescens* Bezzi
13) *Pardalaspis quinaria* Bezzi
14) *Pterandrus rosa* (Karsch)
15) *Rhacochlaena japonica* Ito
16) *Rhagoletis completa* Cresson
17) *Rhagoletis fausta* (Osten-Sacken)
18) *Rhagoletis indifferens* Curran
19) *Rhagoletis mendax* Curran
20) *Rhagoletis pomonella* Walsh
21) *Rhagoletis suavis* (Loew)

(c) Viruses and virus-like organisms

Group of potato viruses and virus-like organisms such as:

1) Andean potato latent virus
2) Andean potato mottle virus
3) Arracacha virus B, oca strain
4) Potato black ringspot virus
5) Potato virus T
6) non-EU isolates of potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leafroll virus

Group of viruses and virus-like organisms of Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L.,Rubus L. and Vitis L., such as:

1) Blueberry leaf mottle virus
2) Cherry rasp leaf virus (American)
3) Peach mosaic virus (American)
4) Peach phony rickettsia
5) Peach rosette mosaic virus
6) Peach rosette mycoplasm
7) Peach X-disease mycoplasm
8) Peach yellows mycoplasm
9) Plum line pattern virus (American)
10) Raspberry leaf curl virus (American)
11) Strawberry witches' broom mycoplasma
12) Non-EU viruses and virus-like organisms of *Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L.* and *Vitis L.*

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Group of *Margarodes* (non-EU species) such as:

1) *Margarodes vitis* (Phillipi)
2) *Margarodes vredendalensis* de Klerk
3) *Margarodes prieskaensis* Jakubski

1.1.2.3. Terms of Reference: Appendix 3

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

Acleris spp. (non-EU)
Amauromyza maculosa (Malloch)
Anomala orientalis Waterhouse
Arrhenodes minutus Drury
Choristoneura spp. (non-EU)
Conotrachelus nenuphar (Herbst)
Dendrolimus sibiricus Tschetverikov
Diabrotica barberi Smith and Lawrence
Diabrotica undecimpunctata howardi Barber
Diabrotica undecimpunctata undecimpunctata Mannerheim
Diabrotica virgifera zeae Krysan & Smith
Diaphorina citri Kuway
Heliothis zea (Boddie)
Hirschmanniella spp., other than *Hirschmanniella gracilis* (de Man) Luc and Goodey
Liriomyza sativae Blanchard
Longidorus diadecturus Eveleigh and Allen
Monochamus spp. (non-EU)
Myndus crudus Van Duzee
Nacobbus aberrans (Thorne) Thorne and Allen
Naupactus leucoloma Boheman
Premnotrypes spp. (non-EU)
Pseudopityophthorus minutissimus (Zimmermann)
Pseudopityophthorus pruinosus (Eichhoff)
Scaphoideus luteolus (Van Duzee)
Spodoptera eridania (Cramer)
Spodoptera frugiperda (Smith)
Spodoptera litura (Fabricus)
Thrips palmi Karny
Xiphinema americanum Cobb sensu lato (non-EU populations)
Xiphinema californicum Lamberti and Bleve-Zacheo

(b) Fungi

Ceratocystis fagacearum (Bretz) Hunt
Chrysomyxa arctostaphyli Dietel
Cronartium spp. (non-EU)
Endocronartium spp. (non-EU)
Guignardia laricina (Saw.) Yamamoto and Ito
Gymnosporangium spp. (non-EU)
Inonotus weirii (Murril) Kotlaba and Pouzar
Melampsora farlowii (Arthur) Davis
Mycosphaerella larici-leptolepis Ito et al.
Mycosphaerella populorum G. E. Thompson
Phoma andina Turkensteen
Phyllosticta solitaria Ell. and Ev.
Septoria lycopersici Speg. var. *malagutii* Ciccarone and Boerema
Thecaphora solani Barrus
Trechispora brinkmannii (Bresad.) Rogers

(c) Viruses and virus-like organisms

Tobacco ringspot virus
Tomato ringspot virus
Bean golden mosaic virus
Cowpea mild mottle virus
Lettuce infectious yellows virus
Pepper mild tigré virus
Squash leaf curl virus
Euphorbia mosaic virus
Florida tomato virus

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex IAII

(a) Insects, mites and nematodes, at all stages of their development

Meloidogyne fallax Karssen
Popillia japonica Newman
Rhizoecus hibisci Kawai and Takagi

(b) Bacteria

Clavibacter michiganensis (Smith) Davis et al. ssp. *sepedonicus* (Spieckermann and Kotthoff) Davis et al.
Ralstonia solanacearum (Smith) Yabuuchi et al.

(c) Fungi

Melampsora medusae Thümen
Synchytrium endobioticum (Schilbersky) Percival

Annex I B

(a) Insects, mites and nematodes, at all stages of their development

Leptinotarsa decemlineata Say
Liriomyza bryoniae (Kaltenbach)

(b) Viruses and virus-like organisms

Beet necrotic yellow vein virus

1.2. Interpretation of the Terms of Reference

Phoma andina Turkensteen is one of a number of pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether it fulfils the criteria of a quarantine pest or those of a regulated non-quarantine pest (RNQP) for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores. The pest has been reclassified as *Stagonosporopsis andigena* (Turkenst.) Aveskamp, Gruyter & Verkley based on morphological observations and DNA sequence data (Aveskamp et al., 2010 – see Section 3.1.1).

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A search of literature (1997–2018) in Web of Science and Scopus was conducted at the beginning of the categorisation. The search focused on *S. andigena* and its geographic distribution, life cycle, host plants and the damage it causes. The following terms of search (TS) and combinations were used: TS = (("*Stagonosporopsis andigena*" OR "*Phoma andigena*" OR "*Phoma andina*" OR "black blight of potato" OR "leaf spot of potato" OR "phoma leaf spot of potato") AND (Solanaceae OR *Solanum* OR Potato OR Tomato) AND (geograph* OR distribution OR "life cycle" OR lifecycle OR damag*)).

Further references and information were obtained from experts, from citations within the references and grey literature.

2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the European and Mediterranean Plan Protection Organization (EPPO) Global Database (EPPO, online) and relevant publications.

Data about the import of commodity types that could potentially provide a pathway for the pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT (Statistical Office of the European Communities).

The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network run by the Directorate General for Health and Food Safety (DG SANTÉ) of the European Commission, and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. The Europhyt database manages notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the Member States (MS) and the phytosanitary measures taken to eradicate or avoid their spread.

2.2. Methodologies

The Panel performed the pest categorisation for *S. andigena*, following guiding principles and steps in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

This work was initiated following an evaluation of the EU plant health regime. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for a Union quarantine pest and for a Union RNQP in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required in accordance with the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to potentially qualify either as a quarantine pest or as a RNQP. If one of the criteria is not met, the pest will not qualify. A pest that does not qualify as a quarantine pest may still qualify as a RNQP that needs to be addressed in the opinion. For the pests regulated in the protected zones only, the scope of the categorisation is the territory of the protected zone; thus, the criteria refer to the protected zone instead of the EU territory.

It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, whereas addressing social impacts is outside the remit of the Panel.

Table 1: Pest categorisation criteria under evaluation, as defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Identity of the pest (Section 3.1)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/ presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest widely distributed within the EU? Describe the pest distribution briefly!	Is the pest present in the EU territory? If not, it cannot be a protected zone quarantine organism.	Is the pest present in the EU territory? If not, it cannot be a regulated non-quarantine pest. (A regulated non-quarantine pest must be present in the risk assessment area)
Regulatory status (Section 3.3)	If the pest is present in the EU but not widely distributed in the risk assessment area, it should be under official control or expected to be under official control in the near future	The protected zone system aligns with the pest free area system under the International Plant Protection Convention (IPPC). The pest satisfies the IPPC definition of a quarantine pest that is not present in the risk assessment area (i.e. protected zone).	Is the pest regulated as a quarantine pest? If currently regulated as a quarantine pest, are there grounds to consider its status could be revoked?

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways!	Is the pest able to enter into, become established in, and spread within, the protected zone areas? Is entry by natural spread from EU areas where the pest is present possible?	Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects? Clearly state if plants for planting is the main pathway!
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?	Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Available measures (Section 3.6)	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?	Are there measures available to prevent the entry into, establishment within or spread of the pest within the protected zone areas such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months (or a period longer than 24 months where the biology of the organism so justifies) after the presence of the pest was confirmed in the protected zone?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met.	A statement as to whether (1) all criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met.	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest were met, and (2) if not, which one(s) were not met.

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process, but following the agreed two-step approach, will continue only if requested by the risk managers. However, during the categorisation process, experts may identify key elements and knowledge gaps that could contribute significant uncertainty to a future assessment of risk. It would be useful to identify and highlight such gaps so that potential future requests can specifically target the major elements of uncertainty, perhaps suggesting specific scenarios to examine.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?

Yes. The identity of Stagonosporopsis andigena is well-established

S. andigena, the causal agent of black blight disease of potato, is a fungus of the family Didymellaceae (EPPO, online). The pest was originally described by Turkensteen (1978a) as *Phoma andina* but later it was found to be a homonym and thus it was renamed as *Phoma andigena* Turkenst. (Boerema et al., 1995). Based on morphological observations and multiple phylogenetic analyses utilising sequences obtained from the 28SnrDNA (LSU), 18S nrDNA (SSU), ITS, *rpb2* and *tub2* regions, the pest was reclassified as *S. andigena* in 2010 (Aveskamp et al., 2010; Chen et al., 2016).

A variant of *P. andina*, initially named *P. andina* var. *crystalliniformis* and later *P. crystalliniformis,* affects both tomato and potato in Colombia and Venezuela (Navarro and Puerta, 1981; Loerakker et al., 1986; Noordeloos et al., 1993). This fungus has been reclassified as *Stagonosporopsis crystalliniformis* based on phylogenetic analyses, and cultural and morphological characteristics, and is a species distinct from *S. andigena* (Aveskamp et al., 2010; Chen et al., 2016).

ased on the above, this pest categorisation focuses on *S. andigena*, the potato pathogen originally described by Turkensteen (1978a) and listed in Council Directive 2000/29/EC as *P. andina*.

The Index Fungorum database (www.indexfungorum.org) provides the following taxonomical identification for *S. andigena*:

Current scientific name: *Stagonosporopsis andigena* (Turkenst.) Aveskamp, Gruyter & Verkley
Family – Didymellaceae
Genus – *Stagonosporopsis*
Species – *andigena*

Other reported synonyms (EPPO, online): *Phoma andigena* Turkensteen; *Phoma andina* Turkensteen

Common name (EPPO, online): black blight of potato

Other common names (EPPO, online): leaf spot of potato, phoma leaf spot of potato

3.1.2. Biology of the pest

Information on the biology of *S. andigena* and the epidemiology of black blight of potato is very limited. The pest survives on host debris in soil and produces pycnidia with pycnidiospores (French, 2001). Potato leaves become infected by the pycnidiospores splashed (rain-splash or overhead irrigation) from the soil surface. Favourable conditions for infection are high humidity or rain and temperatures below 15°C (French, 2001). According to French (2001), chlamydospores have been observed in *in vitro* culture and may also play a role in the survival of the pest. However, in the original description of the pest (as *P. andina*) by Turkensteen (1978a) and in the description of the genus *Stagonosporopsis* provided by Aveskamp et al. (2010), there is no report on chlamydospore formation. The formation of chlamydospores by the pest is not mentioned by Boerema et al. (2004) either. Uncertainty exists on the maximum period the pest survives on host plant debris in soil.

3.1.3. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes. For a reliable detection and identification of *Stagonosporopsis andigena* in potato plants, molecular methods should be considered in addition to symptomatology and cultural and morphological characteristics of the pest.

S. andigena is difficult to be reliably detected and identified based only on host association, symptomatology and morphology, as (i) similar symptoms are caused by other potato foliar fungal or oomycete pathogens (e.g. *Alternaria solani*, *Septoria lycopersici* var. *malagutii*, *Boeremia exigua, Phytophthora infestans*) and (ii) the morphology of its pycnidia and pycnidiospores is similar to that of other closely related taxa (e.g. *Phoma*, *Boeremia*). However, species-specific real-time (TaqMan) polymerase chain reaction (PCR) assay based on DNA sequence differences of the actin gene has been developed for the detection and identification of the pest in *in vitro* culture and in potato leaves. The method allows also for the differentiation of the pest from other closely related species of the genus *Stagonosporopsis* (e.g. *S. crystalliniformis*) and other fungal species of the genera *Boeremia, Didymella, Peyronellaea* and *Phoma*, some of which affect potato and were formerly classified in the genus *Phoma* (i.e. *Boeremia exigua* var. *exigua*, *B. exigua* var. *gilvescens*, *B. foveata*), (de Gruyter et al., 2012).

Therefore, for a reliable detection and identification of the pest, molecular methods should also be considered in addition to symptomatology and morphology.

Symptoms

The pest affects the leaves, stems and petioles of potato plants (French, 2001). On leaves, the pest causes small (mostly less than 2.5 mm in diameter, but they may be up to 10 mm in diameter), blackish, concentric lesions (French, 2001). During the initial stages of the disease, the lesions appear on the lower (older) leaves, but as the disease progresses, lesions develop on all the leaves of the plant. Leaf lesions may coalesce and enlarge until they are delimited by the veins (French, 2001). Severely affected leaves turn blackish as if scorched, remain attached to the stem for some time, and then drop. Elongate lesions develop on stems and petioles (French, 2001). Light-coloured pycnidia can be seen embedded in the affected tissues, with their ostioles emerging through the epidermis (French, 2001). The pest has not been reported to affect underground parts of host plants and Turkensteen (1978b) showed that *S. andigena* does not affect potato tubers.

Morphology

Pycnidia are light-coloured, 125–200 μm in diameter, releasing pycnidiospores of two types: (i) small (2–2.6 × 5.8–7.8 μm) conidia, aseptate, hyaline, thin-walled, smooth, ellipsoidal to subglobose, which are not infective and do not germinate on synthetic media, and (ii) large (5–7 × 14–22 μm), infective conidia, one-celled, broadly cylindrical, sometimes with median constriction (French, 2001). Both types of pycnidiospores can be produced in the same pycnidium *in vivo* and *in vitro* (Aveskamp et al., 2010). No teleomorph has been reported so far.

Colonies are slow-growing and inhibited by the acidity of the medium (EPPO, online). Potato dextrose agar (PDA) and oatmeal agar (OA) media turn yellow-green within 2–3 weeks of incubation, which is characteristic of *S. andigena* cultures (Loerakker et al., 1986).

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

S. andigena is indigenous to areas in the Andean region of South America (EPPO, online) (Figure 1 and Table 2). The pest has been reported to be present in Bolivia and Peru, at altitudes ranging from 2,000 to 3,500 m (French, 2001; EPPO online). *S. andigena* has not been reported from any other part of the world.

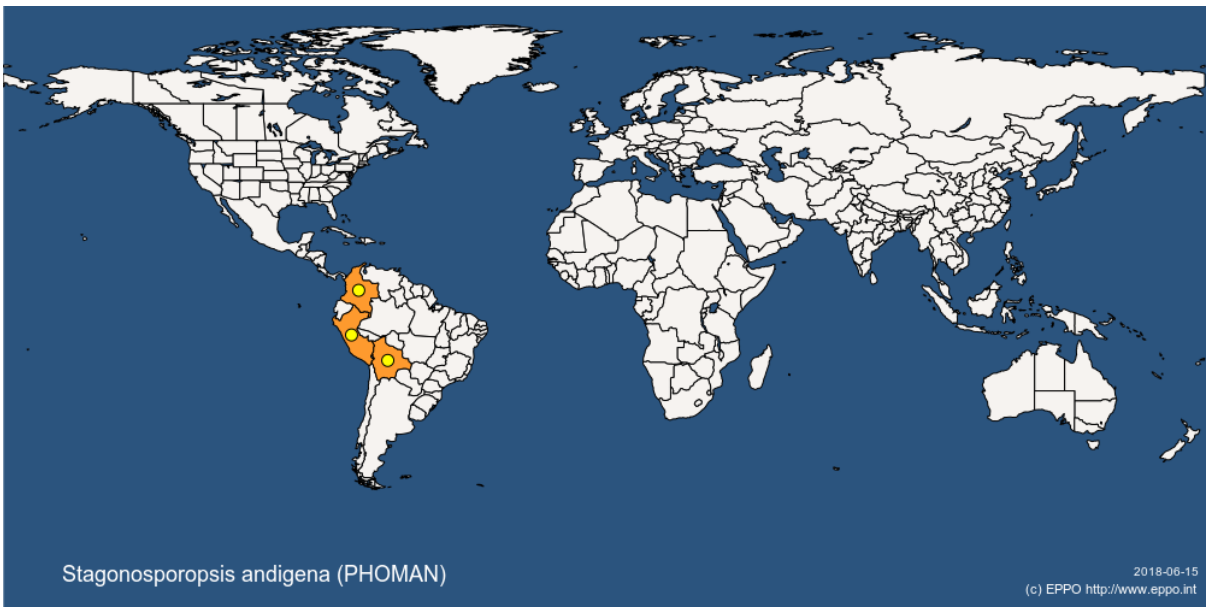

Figure 1: Global distribution map for *Stagonosporopsis andigena* (extracted from the EPPO Global Database accessed on 15/6/2018). The record on the presence of the pest in Colombia, reported by EPPO Global Database needs to be revised, as the cited reference (Tamayo, 1993) refers to *Phoma andina* var. *crystalliniformis* (current name *Stagonosporopsis crystalliniformis*), a fungal species distinct from *S. andigena* (see Section 3.1.1)

Table 2: Global distribution of *Stagonosporopsis andigena* based on information extracted from the EPPO Global Database (last updated: 12/9/2017; last accessed: 16/6/2018)

Continent	Country*	Status
America	Bolivia	Present, no details
	Peru	Present, no details

*: The record on the presence of the pest in Colombia, reported by EPPO Global Database, needs to be revised, as the cited reference (Tamayo, 1993) refers to *Phoma andina* var. *crystalliniformis* (current name *Stagonosporopsis crystalliniformis*), a fungal species distinct from *S. andigena* (see Section 3.1.1).

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest widely distributed within the EU?

No. The pest in not known to be present in the EU territory.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

S. andigena (as *P. andina*) is listed in Council Directive 2000/29/EC. Details are presented in Tables 3 and 4.

Table 3: *Stagonosporopsis andigena* (as *Phoma andina*) in Council Directive 2000/29/EC

Annex I, Part A	**Harmful organisms whose introduction into, and spread within, all member states shall be banned**
Section I	**Harmful organisms not known to occur in any part of the community and relevant for the entire community**
(c)	**Fungi**
12.	*Phoma andina* Turkensteen

3.3.2. Legislation addressing the hosts of *Stagonosporopsis andigena*

Table 4: Regulated hosts and commodities that may involve *Stagonosporopsis andigena* (as *Phoma andina*) in Annexes III, IV and V of Council Directive 2000/29/EC

Annex III, Part A	**Plants, plant products and other objects the introduction of which shall be prohibited in all Member States**	
	Description	Country of origin
10.	Tubers of *Solanum tuberosum* L., seed potatoes	Third countries other than Switzerland
11.	Plants of stolon- or tuber-forming species of *Solanum* L. or their hybrids, intended for planting, other than those tubers of *Solanum tuberosum* L. as specified under Annex III A (10)	Third countries
13.	Plants of *Solanaceae* intended for planting, other than seeds and those items covered by Annex III A (10), (11) or (12)	Third countries, other than European and Mediterranean countries
14.	Soil and growing medium as such, which consists in whole or in part of soil or solid organic substances such as parts of plants, humus including peat or bark, other than that composed entirely of peat	Turkey, Belarus, Moldavia, Russia, Ukraine and third countries not belonging to continental Europe, other than the following: Egypt, Israel, Libya, Morocco, Tunisia
Annex IV, Part A	**Special requirements which shall be laid down by all member states for the introduction and movement of plants, plant products and other objects into and within all Member States**	
Section I	**Plants, plant products and other objects originating outside the Community**	
	Plants, plant products and other objects	Special requirements
34.	Soil and growing medium, attached to or associated with plants, consisting in whole or in part of soil or solid organic substances such as parts of plants, humus including peat or bark or consisting in part of any solid inorganic substance, intended to sustain the vitality of the plants, originating in: – Turkey, – Belarus, Georgia, Moldova, Russia, Ukraine, – non-European countries, other than Algeria, Egypt, Israel, Libya, Morocco, Tunisia	Official statement that: a) the growing medium, at the time of planting, was: – either free from soil, and organic matter, or – found free from insects and harmful nematodes and subjected to appropriate examination or heat treatment or fumigation to ensure that it was free from other harmful organisms, or – subjected to appropriate heat treatment or fumigation to ensure freedom from harmful organisms, and b) since planting: – either appropriate measures have been taken to ensure that the growing medium has been maintained free from harmful organisms, or – within two weeks prior to dispatch, the plants were shaken free from the medium leaving the minimum amount necessary to sustain vitality during transport, and, if replanted, the growing medium used for that purpose meets the requirements laid down in (a).
Section II	**Plants, plant products and other objects originating in the Community**	
	Plants, plant products and other objects	Special requirements

18.2	Tubers of *Solanum tuberosum* L., intended for planting, other than tubers of those varieties officially accepted in one or more Member States pursuant to Council Directive 70/457/EEC of 29 September 1970 on the common catalogue of varieties of agricultural plant species (1)	Without prejudice to the special requirements applicable to the tubers listed in Annex IV(A)(II) (18.1), official statement that the tubers: – belong to advanced selections such a statement being indicated in an appropriate way on the document accompanying the relevant tubers, – have been produced within the Community, and – have been derived in direct line from material which has been maintained under appropriate conditions and has been subjected within the Community to official quarantine testing in accordance with appropriate methods and has been found, in these tests, free from harmful organisms.
18.3	Plants of stolon or tuber-forming species of *Solanum* L., or their hybrids, intended for planting, other than those tubers of *Solanum tuberosum* L. specified in Annex IV(A)(II) (18.1) or (18.2), and other than culture maintenance material being stored in gene banks or genetic stock collections	(a) The plants shall have been held under quarantine conditions and shall have been found free of any harmful organisms in quarantine testing; (b) the quarantine testing referred to in (a) shall: (aa) be supervised by the official plant protection organisation of the Member State concerned and executed by scientifically trained staff of that organisation or of any officially approved body; (bb) be executed at a site provided with appropriate facilities sufficient to contain harmful organisms and maintain the material including indicator plants in such a way as to eliminate any risk of spreading harmful organisms; (cc) be executed on each unit of the material, – by visual examination at regular intervals during the full length of at least one vegetative cycle, having regard to the type of material and its stage of development during the testing programme, for symptoms caused by any harmful organisms, – by testing, in accordance with appropriate methods to be submitted to the Committee referred to in Article 18: – in the case of all potato material at least for: – Andean potato latent virus, – Arracacha virus B. oca strain, – Potato black ringspot virus, – Potato spindle tuber viroid, – Potato virus T, – Andean potato mottle virus, – common potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leaf roll virus, – *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann and Kotthoff) Davis et al., – *Ralstonia solanacearum* (Smith) Yabuuchi et al., – in the case of true seed potato of least for the viruses and viroid listed above; (dd) by appropriate testing on any other symptom observed in the visual examination in order to identify the harmful organisms having caused such symptoms;

		(c) any material, which has not been found free, under the testing specified under (b) from harmful organisms as specified under (b) shall be immediately destroyed or subjected to procedures which eliminate the harmful organism(s); (d) each organisation or research body holding this material shall inform their official Member State plant protection service of the material held.
18.4	Plants of stolon, or tuber-forming species of *Solanum* L., or their hybrids, intended for planting, being stored in gene banks or genetic stock collections	Each organisation or research body holding such material shall inform their official Member State plant protection service of the material held.
Annex V	**Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the Community, before being moved within the Community—in the country of origin or the consignor country, if originating outside the Community) before being permitted to enter the Community**	
Part A	**Plants, plant products and other objects originating in the Community**	
Section I	**Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community and which must be accompanied by a plant passport**	
1.3.	Plants of stolon- or tuber-forming species of *Solanum* L. or their hybrids, intended for planting.	
Part B	Plants, plant products and other objects originating in territories, other than those territories referred to in Part A	
Section I	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community	
4.	Tubers of *Solanum tuberosum* L.	
7.	(a) Soil and growing medium as such, which consists in whole or in part of soil or solid organic substances such as parts of plants, humus including peat or bark, other than that composed entirely of peat. (b) Soil and growing medium, attached to or associated with plants, consisting in whole or in part of material specified in (a) or consisting in part of any solid inorganic substance, intended to sustain the vitality of the plants, originating in: – Turkey, – Belarus, Moldova, Russia, Ukraine, – non-European countries, other than Algeria, Egypt, Israel, Libya, Morocco, Tunisia.	

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

The only cultivated host of *S. andigena* is *Solanum tuberosum* (potato) (French, 2001; EPPO online). In the infested areas, the pest has also been reported on various tuber-forming *Solanum* spp., in particular *S. phureja, S. stenotomum* subsp*. goniocalyx* and *S. medians,* as well as on various solanaceous wild plants/weeds (French, 2001; EPPO, online). In Peru, Turkensteen (1979) evaluated, under natural infection conditions, the susceptibility to black blight of potato of numerous clones of *S. phureja, S. tuberosum* spp. *andigena* as well as of a group of Mexican clones of *S. tuberosum*, *S. neotuberosum* and their hybrids with *S. demissum*; both resistant and susceptible clones were identified in all the above-mentioned potato clones, with *S. phureja* clones showing the lowest disease severity. All the above hosts are regulated in the EU (Council Directive 2000/29/EC).

Solanum lycopersicum (tomato) has been reported either as an incidental host (EPPO, online) or as a host (French, 2001) of the pest. However, these reports are not supported by any of the references listed in these two publications. It is most likely that these literature sources refer to *S. crystalliniformis* (formerly known as a variant of *P. andina*), a distinct fungal species, which affects both tomato and potato in Colombia and Venezuela (see Section 3.1.1). De Gruyter et al. (2012) were able to induce necrosis on detached leaves of tomato cv. Moneymaker by placing mycelial plugs of *S. andigena* directly on the leaves, aiming to obtain material for PCR assays. The Panel considers this inoculation

method as inappropriate for pathogenicity or host range studies, and therefore does not consider tomato as experimental host of *S. andigena*. There is no evidence in the available literature on tomato being a natural host of the pest.

3.4.2. Entry

Is the pest able to enter into the EU territory?

Yes, however, all the pathways associated with host plants for planting and soil and growing media (associated or not with plants for planting) originating in infested third countries are regulated under the current EU legislation (Council Directive 2000/29/EC).

S. andigena is not known to be seed-borne and potato, which is considered the only cultivated host, is propagated with seed tubers, which have been shown not to be affected by the pest (Turkensteen, 1978b). The pest is unlikely to enter the EU territory by natural means (rain or wind-driven rain) because of the distance between the infested third countries and the risk assessment area. *S. andigena* has been reported to survive in plant debris in the soil (see Section 3.1.2). However, uncertainty exists with respect to the maximum period the pest could survive in plant debris, because there is no information in the available literature.

Based on the above, the Panel identified the following pathways for the entry of the pest into the risk assessment area, in the absence of the current EU legislation:

- Soil and growing media associated or not with plants for planting and carrying infected host plant debris.
- Host plants for planting of the family Solanaceae, other than seed tubers, originating in infested third countries and used for ornamental purposes.

The following potential pathways of entry of *S. andigena* into the EU territory are regulated by the current EU legislation (Table 3):

- stolon- or tuber-forming plants for planting of *Solanum* spp., or their hybrids, other than *S. tuberosum* seed tubers, originating in third countries,
- plants for planting of the family Solanaceae, other than *S. tuberosum* seed tubers and stolon- or tuber-forming *Solanum* species, originating in third countries, other than European non-EU28 countries and Mediterranean countries,
- soil and growing media attached to or associated with plants originating in Turkey, Belarus, Georgia, Moldova, Russia, Ukraine and non-European countries, other than Algeria, Egypt, Israel, Libya, Morocco and Tunisia
- soil and growing media not attached to or associated with plants originating in Turkey, Belarus, Moldavia, Russia, Ukraine and third countries not belonging to continental Europe other than Egypt, Israel, Libya, Morocco and Tunisia.

Based on the above, all the pathways associated with host plants for planting, and soil and growing media, as commodity or substrate, originating in infested third countries are regulated (Council Directive 2000/29/EC).

The following potential pathway of entry of *S. andigena* into the EU is currently not regulated:

- infected host plant debris in soil adhering to agricultural machinery and implements, footwear, and vehicles originating in infested third countries.

The Panel considers this pathway as uncertain because of the distance between the infested countries and the risk assessment area, and due to the absence of import data in the Eurostat database (accessed on 2/5/2018). Therefore, this pathway is not considered as a major pathway of entry and is not further addressed in the following sections.

There is no record of interception of *S. andigena* (including its synonyms) in the Europhyt database (online; search performed on 16/7/2018).

3.4.3. Establishment

Is the pest able to become established in the EU territory?

Yes. The biotic (host availability) and abiotic (climate suitability) factors occurring in part of the risk assessment area are favourable for the establishment of *Stagonosporopsis andigena.*

3.4.3.1. EU distribution of main host plants

Potatoes are widely grown in the EU territory (Table 5; Source: Eurostat, data extracted on 3/5/2018).

Table 5: Area (in 1,000 ha) cultivated with *Solanum tuberosum* in the 28 EU Member States between 2011 and 2015 (Source: Eurostat, extracted on 3/5/2018)

Countries	2011	2012	2013	2014	2015	Mean of EU area grown with *Solanum tuberosum* (in 1,000 ha) during the period 2011–2015
European Union (EU28)	1,922	1,798	1,741	1,663	1,656	1,756
Poland	393	373	337	267	293	333
Germany	259	238	243	245	237	244
Romania	248	229	208	203	196	217
France	159	154	161	168	167	162
Netherlands	159	150	156	156	156	155
United Kingdom	146	149	139	141	129	141
Belgium	82	67	75	80	79	77
Spain	80	72	72	76	72	74
Italy	62	59	50	52	50	55
Denmark	42	40	40	20	42	36
Lithuania	37	32	28	27	23	29
Portugal	27	25	27	27	25	26
Sweden	28	25	24	24	23	25
Greece	28	24	25	24	21	24
Czech Republic	26	24	23	24	23	24
Finland	24	21	22	22	22	22
Austria	23	22	21	21	20	22
Hungary	21	25	21	21	19	21
Bulgaria	16	15	13	10	11	13
Latvia	14	12	12	11	10	12
Croatia	11	10	10	10	10	10
Ireland	10	9	11	9	9	10
Slovakia	10	9	9	9	8	9
Estonia	6	6	5	4	4	5
Cyprus	5	5	5	5	5	5
Slovenia	4	3	3	4	3	3
Malta	1	1	1	1	1	1
Luxembourg	1	1	1	1	1	1

3.4.3.2. Climatic conditions affecting establishment

S. andigena has been reported in Bolivia and Peru at altitudes ranging from 2,000 to 3,500 m (French, 2001; EPPO, online). These areas are characterised by different Köppen–Geiger climate types (Peel et al., 2007) (Figure 2). Considering the areas in Bolivia and Peru between 2,000 and 3,500 m altitude where *S. andigena* was reported, the prevalent climate type is temperate (mainly Cwb: dry winter, warm summer, and Cfb: without dry season, warm summer). Arid climate types (BSk: steppe, cold, BWk: desert, cold, and, to a much lesser extent, BSh: steppe, hot) are also present in those areas.

Temperate climate types, such as Cfb, are present in most areas of western Europe, UK, Ireland and in the north of the Iberian Peninsula (Figure 3). Also, arid climate types, such as BSk, are present

in areas of southern EU Member States, like Spain. Therefore, the climatic conditions occurring in some parts of the EU are suitable for the establishment of *S. andigena*.

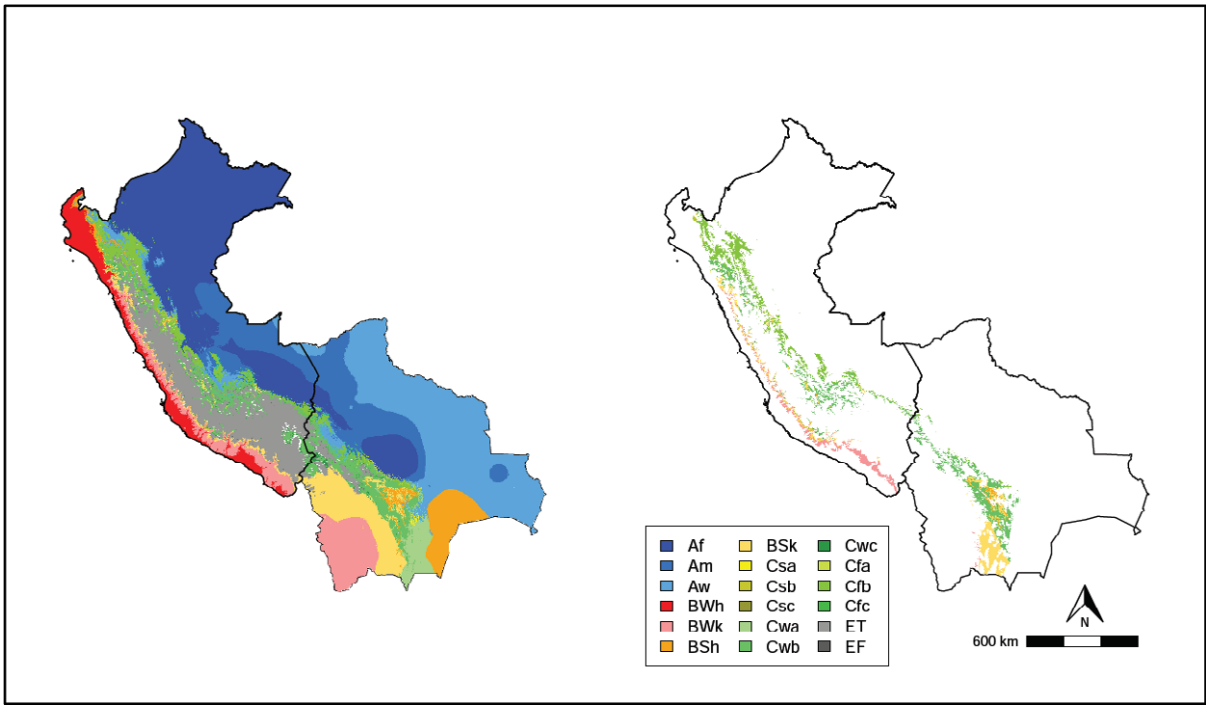

Figure 2: Köppen–Geiger climate type map of Bolivia and Peru (left) and for altitudes ranging from 2,000 to 3,500 m (right)[4]

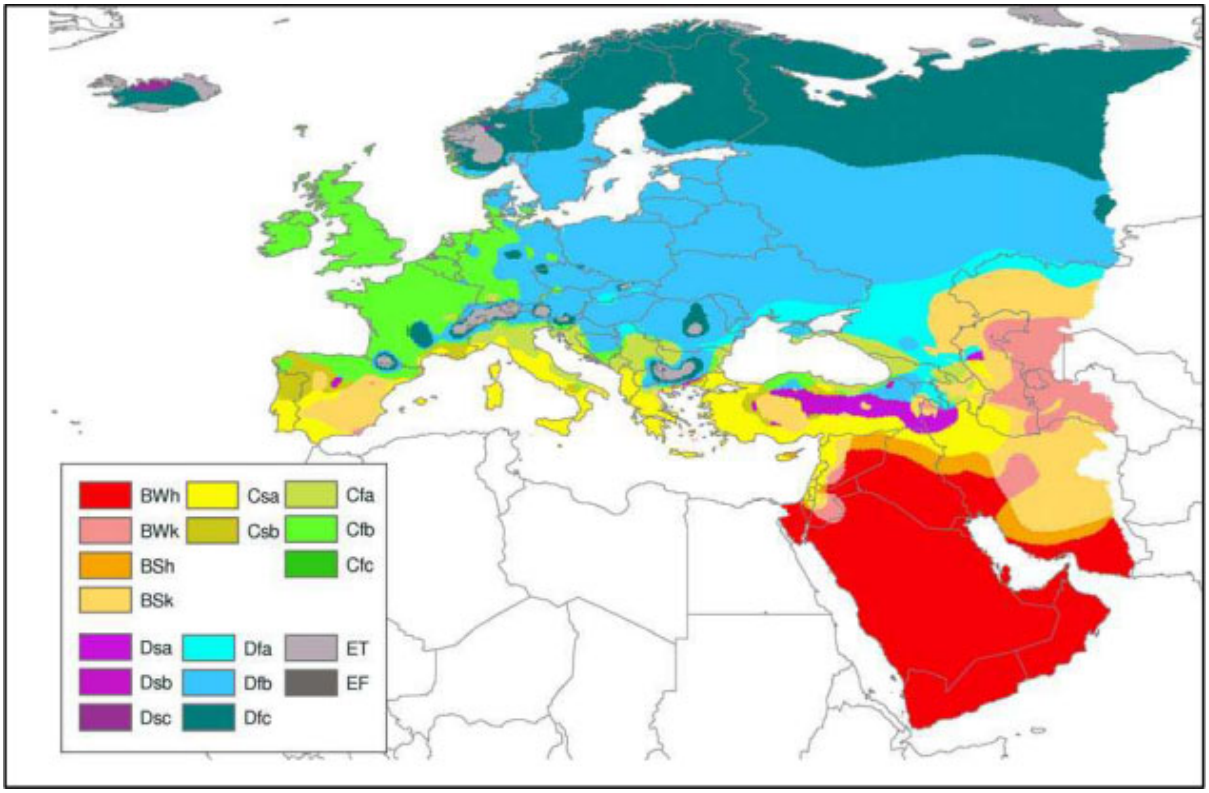

Figure 3: Köppen–Geiger climate type map of Europe, from Peel et al. (2007)

[4] Based on the criteria of Peel et al. (2007) and data at 30-sec spatial resolution from the WorldClim 1.4 database (Hijmans et al., 2005).

3.4.4. Spread

3.4.4.1. Vectors and their distribution in the EU (if applicable)

Is the pest able to spread within the EU territory following establishment? Yes.

How? By natural and human-assisted means

RNQPs: Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects?

YES. Although the pest does not affect potato plants for planting (i.e. seed tubers), it could spread mainly via the movement of host plants for planting of the family Solanaceae, other than seed tubers, grown for ornamental purposes

Following its establishment in the EU territory, the pest could potentially spread by both natural and human-assisted means.

Spread by natural means. Although there is no specific information on the dispersal potential of the pest by natural means, *S. andigena*, similarly to other pycnidia-forming fungi, could spread over relatively short distances by rain-splashed and/or washed-off conidia (Fitt et al., 1989). Nevertheless, uncertainty exists on the maximum distance over which conidia of the pathogen could be dispersed by wind-blown rain.

Spread by human assistance. The pest could potentially spread over long distances via the movement of (i) infected host plants for planting of the family Solanaceae grown for ornamental purposes, and (ii) soil and growing media associated or not with host and non-host plants for planting and carrying infected host plant debris. However, uncertainty exists about the host status of plants for planting of the family Solanaceae grown for ornamental purposes in the EU. Likewise, uncertainty exists on the maximum period the pest survives on host plant debris in soil.

3.5. Impacts

Would the pests' introduction have an economic or environmental impact on the EU territory?

YES. The introduction of the pest in the EU territory would potentially cause direct and indirect impacts to potato production and *Solanum* host species grown for ornamental purposes

RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?

YES. The pest does not affect the potato plants for planting (i.e. seed tubers). However, the presence of the pest on host plants for planting of the family Solanaceae (other than seed tubers) intended for ornamental use would have an economic impact.

Potatoes rank fourth on the list of world food crops, after maize, rice and wheat (FAOSTAT, online). The total world potato production was estimated at 381.7 million tonnes in 2014. The EU ranks third in fresh potato production after China and India (FAOSTAT, online). In 2015, the EU produced 53.2 million tonnes of potatoes, with Germany, France and the Netherlands as the largest producers (Table 6). The value of EU potato production, including seed potatoes, at basic prices was EUR 10 billion, representing 2.5% of the total EU agricultural output and 4.7 % of the crop output at EU level (de Cicco and Jeanty, 2017). Most potatoes are traded in the internal EU market. The EU is a net potato exporter, but potatoes are imported into its territory in winter and spring from Southern and Eastern Mediterranean countries (de Cicco and Jeanty, 2017).

Table 6: Potato production, including potato seed tubers, in the 28 EU Member States in 2015 (Source: Eurostat; extracted on 2/5/2018)

Country	Harvested production (in 1,000 tonnes)	Share of 28 EU MSs harvested production (%)
EU28	53,160	100.00
Germany	10,370	19.51
France	7,114	13.38
Netherlands	6,652	12.51

Country	Harvested production (in 1,000 tonnes)	Share of 28 EU MSs harvested production (%)
Poland	6,152	11.57
United Kingdom	5,598	10.53
Belgium	3,665	6.89
Romania	2,625	4.94
Spain	2,284	4.30
Denmark	1,748	3.29
Italy	1,355	2.55
Sweden	803	1.51
Greece	556	1.05
Austria	536	1.01
Finland	532	1.00
Czech Republic	505	0.95
Portugal	487	0.92
Hungary	452	0.85
Lithuania	392	0.74
Ireland	360	0.68
Latvia	204	0.38
Croatia	171	0.32
Bulgaria	165	0.31
Slovakia	145	0.27
Cyprus	96	0.18
Slovenia	91	0.17
Estonia	81	0.15
Luxembourg	13	0.02
Malta	8	0.02

In the affected areas of Bolivia and Peru, *S. andigena* is ranked second in importance after potato late blight (*P. infestans*). Yield reductions may reach up to 80%, depending on the level of susceptibility of potato cultivars (French, 2001; EPPO, online). Application of fungicide sprays early in the season, before lesions become abundant, and cultivation of resistant potato cultivars are the most effective measures for the management of the disease in the infested countries (Turkensteen, 1980; EPPO, online).

The introduction of the pest in the EU territory would potentially cause direct and indirect impacts to potato production. However, uncertainty exists whether current agricultural practices (e.g. potato cultivars) and chemical control methods applied in the EU could reduce the impact of pest introduction.

3.6. Availability and limits of mitigation measures

Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?

YES. Please, see Section 3.3.

RNQPs: Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?

YES. The presence of the pest on host plants for planting of the family Solanaceae (other than seed tubers) could be prevented by sourcing them in pest-free areas or places of production

3.6.1. Identification of additional measures

Phytosanitary measures (sourcing from pest-free areas or pest-free places of production, inspection and lab testing both at the place of origin and at the EU entry point) are currently applied to the major

host and pathways of entry, which are all regulated (Council Directive 2000/29/EC) (see Section 3.3). There are no additional major hosts or pathways of entry.

There are no measures that could prevent the establishment of the pest in the EU territory.

3.7. Uncertainty

1) Host range. It is not known whether wild or ornamental species of the genus *Solanum* in the EU territory are hosts of the pest.
2) Entry. Uncertainty exists on whether the pest could enter the EU territory on infected host plant debris in soil adhering to agricultural machinery and implements, footwear and vehicles, because of the distance between the infested countries and the risk assessment area, and due to the absence of import data in the Eurostat database.
3) Entry and spread. Uncertainty exists on the maximum period the pest survives on host plant debris in soil.
4) Spread. Uncertainty exists on the maximum distance over which conidia of the pathogen could be dispersed by wind-blown rain.
5) Impact. Uncertainty exists whether the agricultural practices (e.g. potato cultivars) and chemical control methods currently applied in the EU could reduce the impact of pest introduction.

4. Conclusions

S. andigena meets all the criteria assessed by EFSA for consideration as potential Union quarantine pest (Table 7). The criteria for considering *S. andigena* as a potential Union RNQP are not met since the pest is not known to be present in the EU.

Table 7: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	The identity of the pest (*Stagonosporopsis andigena*) is clearly defined and there are reliable methods for its detection and identification	The identity of the pest (*Stagonosporopsis andigena*) is clearly defined and there are reliable methods for its detection and identification	None
Absence/ presence of the pest in the EU territory (Section 3.2)	The pest is not known to be present in the EU territory	The pest is not known to be present in the EU territory	None
Regulatory status (Section 3.3)	The pest is currently officially regulated in the EU as a quarantine pest (Council Directive 2000/29/EC)	The pest is currently officially regulated in the EU as a quarantine pest (Council Directive 2000/29/EC). There are no grounds to consider its status could be revoked	None

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Entry: All potential pathways of entry of the pest into the risk assessment area are regulated (Council Directive 2000/29/EC) Establishment: The host availability and climate factors occurring in part of the risk assessment area are favourable for the establishment of the pest Spread: Following introduction, the pest could potentially spread by natural and human-assisted means	The pest does not affect potato seed tubers. Therefore, potato plants for planting is not a means of spread Host plants for planting of the family Solanaceae, other than seed tubers, grown for ornamental purposes are potential means of spread of the pest	It is not known whether wild or ornamental species of the genus *Solanum* in the EU territory are hosts of the pest (Uncertainty 1) Uncertainty exists on whether the pest could enter the EU territory on host plant debris in soil adhering to agricultural machinery and implements, footwear and vehicles (Uncertainty 2) Uncertainty exists on the maximum period the pest survives on host debris in soil (Uncertainty 3) No information on the maximum distance over which conidia of the pathogen could be dispersed by wind-blown rain (Uncertainty 4)
Potential for consequences in the EU territory (Section 3.5)	The introduction of the pest in the EU territory would potentially cause direct and indirect impacts to potato production	The presence of the pest on host plants for planting of the family Solanaceae, other than seed tubers, intended for ornamental use would have an economic impact	Uncertainty exists whether the agricultural practices and chemical control methods currently applied in the EU could reduce the impact of pest introduction (Uncertainty 5)
Available measures (Section 3.6)	There are measures available to prevent the introduction into, and spread within the EU of the pest such that the risk becomes mitigated. These measures are described in Council Directive 2000/29/EC	The presence of the pest on host plants for planting of the family Solanaceae (other than seed tubers) could be prevented by sourcing them in pest-free areas or places of production	None
Conclusion on pest categorisation (Section 4)	*Stagonosporopsis andigena* meets all the criteria assessed by EFSA for consideration as potential Union quarantine pest	The criteria for considering *S. andigena* as a potential Union regulated non-quarantine pest are not met since the pest is not known to be present in the EU	None
Aspects of assessment to focus on/ scenarios to address in future if appropriate	None		

References

Aveskamp MM, de Gruyter J, Woudenberg JHC, Verkley GJM and Crous PW, 2010. Highlights of the Didymellaceae: a polyphasic approach to characterise *Phoma* and related pleosporalean genera. Studies in Mycology, 65, 1–60.

Boerema GH, De Gruyter J and Noordeloos ME, 1995. New names in *Phoma*. Persoonia, 16, 131.

Boerema GH, De Gruyter J, Noordeloos ME and Hamers MEC, 2004. *Phoma* identification manual - Differentiation of specific and infra-specific taxa in culture. CABI Publishing. ISBN 0 85199 743 0.

Chen Q, Jiang JR, Zhang GZ, Cai L and Crous PW, 2016. Resolving the *Phoma* enigma. Studies in Mycology, 82, 137–217. https://doi.org/10.1016/j.simyco.2015.10.003

de Cicco A and Jeanty J-C, 2017. The EU potato sector-statistics on production, prices and trade. Available online: http://ec.europa.eu/eurostat/statistics-explained/index.php?title=The_EU_potato_sector_-statistics_on_production,_prices_and_trade&oldid=379570

EPPO (European and Mediterranean Plant Protection Organization), online. EPPO Global Database. Available online: https://gd.eppo.int [Accessed: 16 June 2018].

FAO (Food and Agriculture Organization of the United Nations), 1995. ISPM (International standards for phytosanitary measures) No 4. Requirements for the establishment of pest free areas. Available online: https://www.ippc.int/en/publications/614/

FAO (Food and Agriculture Organization of the United Nations), 2004. ISPM (International Standards for Phytosanitary Measures) 21—Pest risk analysis of regulated non-quarantine pests. FAO, Rome, 30 pp. Available online: https://www.ippc.int/sites/default/files/documents//1323945746_ISPM_21_2004_En_2011-11-29_Refor.pdf

FAO (Food and Agriculture Organization of the United Nations), 2013. ISPM (International Standards for Phytosanitary Measures) 11—Pest risk analysis for quarantine pests. FAO, Rome, 36 pp. Available online: https://www.ippc.int/sites/default/files/documents/20140512/ispm_11_2013_en_2014-04-30_201405121523-494.65%20KB.pdf

FAO (Food and Agriculture Organization of the United Nations), 2017. ISPM (International standards for phytosanitary measures) No 5. Glossary of phytosanitary terms. Available online: https://www.ippc.int/en/publications/622/

FAOSTAT, online. Food and Agriculture Organization of the United Nations (FAO) crop statistics. Available online: http://www.fao.org/faostat/en/#data/QC

Fitt BDL, McCartney HA and Walklate PJ, 1989. The role of rain in dispersal of pathogen inoculum. Annual Review of Phytopathology, 27, 241–270.

French, 2001. Phoma leaf spot. In: Hooker WJ (ed.). Compendium of potato diseases. 2nd Edition. The American Phytopathological Society, St. Paul, Minnesota, USA. pp. 32–33.

de Gruyter J, van Gent-Pelzer MPE, Woudenberg JHC, van Rijswick PCJ, Meekes ETM, Crous PW and Bonants PJM, 2012. The development of a validated real-time (TaqMan) PCR for detection of *Stagonosporopsis andigena* and *S. crystalliniformis* in infected leaves of potato and tomato. European Journal of Plant Pathology. 134, 301–313. Available online: https://doi.org/10.1007/s10658-012-9990-8

Hijmans RJ, Cameron SE, Parra JL, Jones PG and Jarvis A, 2005. Very high-resolution interpolated climate surfaces for global land areas. International Journal of Climatology, 25, 1965–1978.

Loerakker WM, Navarro R, Lobo M and Turkensteen LJ, 1986. *Phoma andina* var. *chrystalliniformis* var. nov., un patógeno nuevo del tomate y de la papa en los Andes. Fitopatología, 21, 99–102.

Navarro RA and Puerta OD, 1981. Presencia de *Phoma* sp. en tomate (*Lycopersicon esculentum*). Ascolfi Informa, 7, 32.

Noordeloos ME, De Gruyter J, Van Eijk GW and Roeijmans HJ, 1993. Production of dendritic crystals in pure cultures of *Phoma* and *Ascochyta* and its value as a taxonomic character relative to morphology, pathology and cultural characteristics. Mycological Research, 97, 1343–1350.

Peel MC, Finlayson BL and McMahon TA, 2007. Updated world map of the Köppen-Geiger climate classification. Hydrology and Earth System Sciences, 11, 1633–1644.

Tamayo MPJ, 1993. *Phoma andina* var. *crystalliniformis* on tomatoes in Antioquia. Ascolfi Informa, 19, 12.

Turkensteen LJ, 1978a. Tizón foliar de la papa en el Perú: I. Especies de Phoma asociadas. Fitopatología, 13, 67–69.

Turkensteen LJ, 1978b. Tizón foliar de la papa en el Perú: II. Patogeneidad de las especies de *Phoma* y otros hongos asociados y el organismo causa. Fitopatología, 13, 70–72.

Turkensteen LJ, 1979. Tizón foliar de la papa en el Perú: III. Resistencia e interaccion con tizón tardio en *Solanum phureja, S. tuberosum* spp. *andigena*, e hibridos de *S. deinissum*. Fitopatología, 14, 29–32.

Turkensteen LJ, 1980. Phoma leaf spot. In: Hooker WJ (ed.). Compendium of potato diseases. 1st Edition. The American Phytopathological Society, St. Paul, Minnesota, USA. pp. 47–48.

Abbreviations

DG SANTÉ	Directorate General for Health and Food Safety
EPPO	European and Mediterranean Plant Protection Organization

FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
MS	Member State
OA	oatmeal agar
PCR	polymerase chain reaction
PDA	potato dextrose agar
PLH	EFSA Panel on Plant Health
RNQP	regulated non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 1995, 2017)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017)
Measures	Control (of a pest) is defined in ISPM 5 (FAO, 2017) as 'Suppression, containment or eradication of a pest population' (FAO, 1995). Control measures are measures that have a direct effect on pest abundance. Supporting measures are organisational measures or procedures supporting the choice of appropriate Risk Reduction Options that do not directly affect pest abundance
Pathway	Any means that allows the entry or spread of a pest (FAO, 2017)
Phytosanitary measures	Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests (FAO, 2017)
Protected zones (PZ)	A protected zone is an area recognised at EU level to be free from a harmful organism, which is established in one or more other parts of the Union
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO, 2017)
Regulated non-quarantine pest	A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (FAO, 2017)
Risk reduction option (RRO)	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A RRO may become a phytosanitary measure, action or procedure according to the decision of the risk manager
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO, 2017)