NAME OF THE ORGANISM: Botrytis cinerea (BOTRCI)

GENERAL INFORMATION ON THE PEST

Name as submitted in the project specification (if different to the preferred name):

Pest category:

Fungi **1- Identity of the pest/Level of taxonomic listing:**
Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?

Yes
Is the pest defined at the species level or lower?:

Yes
Can listing of the pest at a taxonomic level higher than species be supported by scientific reasons or can species be identified within the taxonomic rank which are the (main) pests of concern?

* Not relevant: Vegetable propagating and planting material (other than seeds) sector, Oil and fibre plants sector

Is it justified that the pest is listed at a taxonomic rank below species level?

Not relevant
Conclusion:

* Candidate: Vegetable propagating and planting material (other than seeds) sector, Oil and fibre plants sector

Justification (if necessary):

Remark on taxonomy: According to the International Commission of the Taxonomy of Fungi, the list of plant pathogenic fungi (posted 08/25/2015) by the International Subcommission for the Taxonomy of Phytopathogenic Fungi was updated (<http://www.fungaltaxonomy.org/index.php/download_file/view/132/1/>). According to this list the appropriate name should be Botrytis cinerea. **2 – Status in the EU:**

Is this pest already a quarantine pest for the whole EU?

No
Presence in the EU:

Yes
Conclusion:

candidate
Justification (if necessary):

The pest is present worldwide (Ellis & Waller, 1974).

HOST PLANT N°1: Allium cepa (ALLCE) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

RNQP Questionnaire
Plants for planting:

Plants intended for planting **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

No
Conclusion:

Not candidate

Justification:

This worldwide ubiquitous fungus survives in and around fields and glasshouses as a saprophyte on dead or decaying plants and crop debris, as sclerotia in the soil and is also a pathogen on many types of crops and wild plants. Windborne spores develop from these sources and infect damaged or senescent tissues and will infect new tissue under suitable conditions. Seedlings for transplanting may become infected or contaminated with sporangia but crops can be routinely protected with fungicides and/or by manipulating humidity, ventilation and heating (Ellis & Waller, 1974). Crops planted into the field or glasshouse will be quickly be subjected to windborne inoculum and infection from many outside sources. Therefore although plants for planting (as bulb sets) are a pathway, it is not considered they will be a significant source compared to these other pathways. **CONCLUSION ON THE STATUS:**

Disqualified: plants for planting are not considered to be the main pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Not recommended for the RNQP status. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Not recommended for the RNQP status. **REFERENCES:**

* Ellis MB & Waller JM (1974) Sclerotinia fuckeliana. CMI Descriptions of Pathogenic Fungi and Bacteria 431, Set No 44;

HOST PLANT N°2: Allium cepa Aggregatum types (Allium ascalonicum) (ALLAS) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

RNQP Questionnaire
Plants for planting:

Plants intended for planting **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

No
Conclusion:

Not candidate

Justification:

This worldwide ubiquitous fungus survives in and around fields and glasshouses as a saprophyte on dead or decaying plants and crop debris, as sclerotia in the soil and is also a pathogen on many types of crops and wild plants. Windborne spores develop from these sources and infect damaged or senescent tissues and will infect new tissue under suitable conditions. Seedlings for transplanting may become infected or contaminated with sporangia but crops can be routinely protected with fungicides and/or by manipulating humidity, ventilation and heating (Ellis & Waller, 1974). Crops planted into the field or glasshouse will be quickly be subjected to windborne inoculum and infection from many outside sources. Therefore although plants for planting (as shallot sets) are a pathway, it is not considered they will be a significant source compared to these other pathways. **CONCLUSION ON THE STATUS:**

Disqualified: plants for planting are not considered to be the main pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Not recommended for the RNQP status. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Not recommended for the RNQP status. **REFERENCES:**

* Ellis MB & Waller JM (1974) Sclerotinia fuckeliana. CMI Descriptions of Pathogenic Fungi and Bacteria 431, Set No 44;

HOST PLANT N°3: Brassica pekinensis (BRSPK) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

2 - Vegetable seedling sector: Commission Directive 93/61/EC
Plants for planting:

Plants intended for planting **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

No
Conclusion:

Not candidate

Justification:

This worldwide ubiquitous fungus survives in and around fields and glasshouses as a saprophyte on dead or decaying plants and crop debris, as sclerotia in the soil and is also a pathogen on many types of crops and wild plants. Windborne spores develop from these sources and infect damaged or senescent tissues and will infect new tissue under suitable conditions. Seedlings for transplanting may become infected or contaminated with sporangia but crops can be routinely protected with fungicides and/or by manipulating humidity, ventilation and heating (Ellis & Waller, 1974). Crops planted into the field or glasshouse will be quickly be subjected to windborne inoculum and infection from many outside sources. Therefore although plants for planting are a pathway, it is not considered they will be a significant source compared to these other pathways. **CONCLUSION ON THE STATUS:**

Disqualified: plants for planting are not considered to be the main pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* Ellis MB & Waller JM (1974) Sclerotinia fuckeliana. CMI Descriptions of Pathogenic Fungi and Bacteria 431, Set No 44;

HOST PLANT N°4: Cannabis sativa (CNISA) for the Oil and fibre plants sector.

Origin of the listing:

RNQP Questionnaire
Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

?
Conclusion:

Candidate

Justification:

Botrytis spp. is listed in EU Marketing Directive 2002/57 with a threshold, however no references to other species of Botrytis were found affecting Cannabis sativa.
Botrytis cinerea (grey mould) is a worldwide, ubiquitous fungus with a wide host range of herbaceous annual and perennial plants causing a primary and secondary rot, especially after damage or conditions of high humidity. Sclerotia and conidia are formed on fallen fruit and plant debris from which wind-borne ascospores and condia are released into the air to infected new plant material of many species. Botrytis cinerea was not specifically listed as being found on hemp seed during a survey of genebank seed in Romania, though report unclear (Plăcintă & Murariu, 2016). The SEWG concluded that there was uncertainties concerning the significance of the seed pathway leading to an impact on the germination and on the crop establishment compared to pest free seed, or seed which has been treated against the pest. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

It is listed as a serious disease of hemp in NZ (McPartland, 1996) where Botrytis cinerea, togther with two other fungi, rot flowering tops and stalks of hemp (Cannabis sativa) (McPartland & Rhode 2005). During 1995-96, diseases of hemp were surveyed in Germany and Botrytis cinerea a causal agent of stem rot, occurred on some individual plants though optimal crop density and minimal N-fertilization contained the disease. Fungicidal seed dressings are recommended for the control of emerging seed-borne or soil-borne fungi (e.g. Fusarium spp. and Botrytis spp.). It was suggested that it is not necessary to apply specific plant protection products against weeds, diseases or pests of hemp, although general seed dressings are recommended (Patschke et al., 1997). Most of 11 vars. tested in Poland were severely infected though spraying reduced infection, and increased fibre yield (Krzysztalowska H. 1973).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minor
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

Yes
Is there unacceptable economic impact caused to other hosts (or the same host with a different intended use) produced at the same place of production due to the transfer of the pest from the named host plant for planting?

No
Conclusion:

Not candidate
Justification:

Evidence of economic impacts is not as strong as for sunflower and flax. It is not a candidate for the RNQP status on the basis of the evidence available to the SEWG. **CONCLUSION ON THE STATUS:**

Disqualified: Evidence of economic impacts is not as strong as for sunflower and flax. Not a candidate on the basis of the evidence available to the SEWG. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Not recommended for the RNQP status. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Not recommended for the RNQP status. **REFERENCES:**

* Krzysztalowska H (1973) Contribution to the study on the occurrence of Botrytis cinerea (Pers./Lev.) on hemp and the possibilities of its control. Pr. Inst. Krajow. Wlok. Natur. 20, 113-124;
* McPartland JM (1996) A review of Cannabis diseases. Journal of the International Hemp Association 3, 19-23;
* McPartland JM & Rhode B (2005) New hemp diseases and pests in New Zealand. Journal of Industrial Hemp 10,99-108;
* Patschke K, Gottwald R & Müller R (1997) First results of phytopathological studies in hemp crops in Brandenburg Land. Nachrichtenblatt des Deutschen Pflanzenschutzdienstes 49, 286-290;
* Plăcintă DD & Murariu D (2016) Fungus evaluation from seeds germplasm before medium and long term storage. Cercetări Agronomice în Moldova 49,71-82;

HOST PLANT N°5: Cichorium endivia (CICEN) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

2 - Vegetable seedling sector: Commission Directive 93/61/EC
Plants for planting:

Plants intended for planting **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

No
Conclusion:

Not candidate

Justification:

This worldwide ubiquitous fungus survives in and around fields and glasshouses as a saprophyte on dead or decaying plants and crop debris, as sclerotia in the soil and is also a pathogen on many types of crops and wild plants. Windborne spores develop from these sources and infect damaged or senescent tissues and will infect new tissue under suitable conditions. Seedlings for transplanting may become infected or contaminated with sporangia but crops can be routinely protected with fungicides and/or by manipulating humidity, ventilation and heating (Ellis & Waller, 1974). Crops planted into the field or glasshouse will be quickly be subjected to windborne inoculum and infection from many outside sources. Therefore although plants for planting (as shallot sets) are a pathway, it is not considered they will be a significant source compared to these other pathways. **CONCLUSION ON THE STATUS:**

Disqualified: plants for planting are not considered to be the main pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* Ellis MB & Waller JM (1974) Sclerotinia fuckeliana. CMI Descriptions of Pathogenic Fungi and Bacteria 431, Set No 44;

HOST PLANT N°6: Helianthus annuus (HELAN) for the Oil and fibre plants sector.

Origin of the listing:

RNQP Questionnaire
Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

Botrytis spp. is listed in Directive 2002/57 with a threshold, however no references to other species than B. cinerea were found affecting Helianthus annus.
Botrytis cinerea (grey mould) is a worldwide, ubiquitous fungus with a wide host range of herbaceous annual and perennial plants causing a primary and secondary rot, especially after damage or conditions of high humidity. Sclerotia and conidia are formed on fallen fruit and plant debris from which wind-borne ascospores and condia are released into the air to infected new plant material of many species. On sunflower it causes a bud blast or flower blight, causing rotting of seed heads. Information on percentage seed infected in Russia was given for two years (Piven et al., 2010) and in Bangdadesh B. cinerea was second in order of prevalence and second in order of predominance out of the nine fungi recorded on seed samples (Rahman & Fakir, 2007). Botrytis cinerea was detected on sunflower and safflower seed imported from the USA and Germany to India (Chakrabarty et al., 2004).
A proficiency test (PT) of the ISTA Seed Health Committee was organized in 2007 to verify the ability of laboratories to detect, using ISTA method 07-003, the percentage of Helianthus annuus seeds infected by Botrytis cinerea and it was found many laboratories over- or underestimated the percentage of B. cinerea (Sérandat et al., 2007). Further testing method details were given in the revised method effective from 1/1/2017 (ISTA 2017).
Although the pathogen is ubiquitous the view of the SEWG was that the presence on the seed is a pathway that directly impact the germination and crop establishment compared to pest free seed, or seed which has been treated against the pest. Seeds are the main pathway as it is a dead end host itself. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

This pest is quoted in general terms in some abstracts as causing severe head infection in Croatia, Russia and UK where early maturity is desired to avoid high losses due to wetter weather. In a UK trial some early maturing cultivars were particularly susceptible with > 50% of the heads destroyed before harvest, others however, had < 5% of completely infected heads. Some fungicides failed to control (Anon 1985). Use of fungicides reduced degree of attack by Botrytis cinerea infection from 7.25% to 2.05 to 2, 9% in Romania (Draghici, R. 2010). Monitoring the mycopopulation of sunflower grain from experimental fields in Croatia found the incidence of parasitic fungi (Botrytis cinerea, and others) in all trial years was sporadic to weak (Ćosić et al., 2011).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Medium
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

No
Conclusion:

Candidate
Justification:

Although the pathogen is ubiquitous the view of the SEWG was that the presence on the seed has a significant economic impact on the germination and crop establishment compared to pest free seed, or seed which has been treated against the pest. **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

a) Laboratory tests according to ISTA Methods;
b) treatment of seeds with registered plant protection products. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on data. Although the pathogen is ubiquitous the view of the SEWG was that the presence on the seed has a significant economic impact on the germination and crop establishment compared to pest free seed, or seed which has been treated against the pest. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Basic and certified material:
(a) Seed treatment authorised for use against Botrytis cinerea has been applied;
or
(b) Not more than 5% of seed affected with Botrytis cinerea based on laboratory test of a representative sample. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Measures do not need to be specified for non-treated seeds (see defined threshold). **REFERENCES:**

* Anon (1986) Rothamsted Experimental Station UK Report for 1985, 123;
* Ćosić J, Vrandečić K, Poštić J & Dimić D (2011) Mycopopulation of sunflower grain. Glasnik Zaštite Bilja 34, 40-45;
* Chakrabarty SK, Anitha K, Rao RDVJP, Mohammed Ismail, Babu BS, Babu Abraham, Varaprasad KS & Khetarpal RK (2004) Pests intercepted in oilseeds germplasm imported during 1986-2003. Indian Journal of Plant Protection 32, 20-124;
* Draghici R (2010) Research the influence of treatment plant application on sunflower culture located in sandy soils conditions. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series 40,361-367;
* ISTA (2017) 07‑003: Detection of Botrytis cinerea in Helianthus annuus (sunflower) seed. online at <http://www.seedtest.org/upload/cms/user/2017-SH-7-003.pdf>;
* Piven VT, Muradasilova NV, Shulyak II & Alifirova TP (2010) Methods of isolation of pathogenic microflora from sunflower seeds. Zashchita i Karantin Rasteniĭ 2, 57-61;
* Rahman MM & Fakir GA (2007) Study on seed health status of sunflower in Bangladesh. Bangladesh Journal of Plant Pathology 23, 51-56;
* Sérandat I, Grimault V & Léchappé J (2007) Proficiency test Botrytis cinerea on Helianthus annuus (ISTA method 07-003). Seed Testing International 135, 37-41;

HOST PLANT N°7: Lactuca sativa (LACSA) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

2 - Vegetable seedling sector: Commission Directive 93/61/EC
Plants for planting:

Plants intended for planting **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

No
Conclusion:

Not candidate

Justification:

This worldwide ubiquitous fungus survives in and around fields and glasshouses as a saprophyte on dead or decaying plants and crop debris, as sclerotia in the soil and is also a pathogen on many types of crops or wild plants. Windborne spores develop from these sources and infect damaged or senescent tissues and will quickly infect new tissue under suitable conditions. Seedlings for transplanting may become infected or contaminated with sporangia but crops can be routinely protected with fungicides and/or by manupulating ventilation and heating (Ellis & Waller, 1974; Compendium of Lettuce Diseases, 1997). Crops planted into the field or glasshouse will be quickly be subjected to windborne infection from many outside sources. Therefore although plants for planting are a pathway, it is not considered they will be a significant source compared to these other pathways. **CONCLUSION ON THE STATUS:**

Disqualified: plants for planting are not considered to be the main pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* Ellis MB & Waller JM (1974) Sclerotinia fuckeliana. CMI Descriptions of Pathogenic Fungi and Bacteria 431, Set No 44;
* Compendium of Lettuce Diseases (1997). The American Phytopathological Society;

HOST PLANT N°8: Linum usitatissimum (LIUUT) for the Oil and fibre plants sector.

Origin of the listing:

RNQP Questionnaire
Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

Botrytis spp. is listed in 2002/57 with a threshold, however no references to other species of Botrytis were found affecting Linum usitatissimum.
Botrytis cinerea (grey mould) is a worldwide, ubiquitous fungus with a wide host range of herbaceous annual and perennial plants causing a primary and secondary rot, especially after damage or conditions of high humidity. Sclerotia and conidia are formed on fallen fruit and plant debris from which wind-borne ascospores and condia are released into the air to infected new plant material of many species. Botrytis cinerea was not specifically listed as being found on flax seed during a survey of genebank seed in Romania, though report unclear (Plăcintă & Murariu, 2016). However it was found as one of the most often-isolated species in seeds in Poland (Pristchepa et al., 2006). B. cinerea is also known on linseed in the UK where, (with two other pathogens), it is carried in the seed coat in the form of resting hyphae and is quickly activated on germination. A seed testing method has been published (ISTA 2017). In the absence of control measures it can reduce germination, crop vigour and yield though its relative importance was not separated from the two other pathogens. The most effective method of control is by seed treatment (Mercer & Hardwick, 1991). Although the pathogen is ubiquitous the view of the SEWG was that the presence on the seed is a pathway that directly impact the germination and crop establishment compared to pest free seed, or seed which has been treated against the pest. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

In spring linseed, the predominant disease was grey mould (Botrytis cinerea) in wet years in UK (Perryman & Fitt, 2000). In flax in UK, Botrytis cinerea was common higher up the stem and on the seed head and caused destruction of the integrity of the cellulose fibres (Brown & Mercer, 1986).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Medium
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

No
Conclusion:

Candidate
Justification:

 **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

a) Laboratory tests according to ISTA Methods;
b) treatment of seeds with registered plant protection products. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on data. Although the pathogen is ubiquitous the view of the SEWG was that the presence on the seed has a significant economic impact on the germination and crop establishment compared to pest free seed, or seed which has been treated against the pest. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Basic and certified material:
(a) Seed treatment authorised for use against Botrytis cinerea has been applied;
or
(b) Not more than 5% of seed affected with Botrytis cinerea based on laboratory test of a representative sample. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Measures do not need to be specified for non-treated seeds (see defined threshold). **REFERENCES:**

* Brown AE, Mercer PC (1986) Root-rot pathogens of flax and microbial retting. Annual Report on Research and Technical Work of the Department of Agriculture for Northern Ireland 1985, 133-134;
* ISTA (2017) 7‑007: Detection of Alternaria linicola, Botrytis cinerea and Colletotrichum lini in Linum usitatissimum (flax) seed. Available at: <http://www.seedtest.org/upload/cms/user/2017-SH-7-007.pdf>;
* Mercer PC & Hardwick NV (1991) Control of seed-borne diseases of linseed. Aspects of Applied Biology 28, 71-77;
* Perryman SAM & Fitt BDL (2000) Effects of diseases on the growth and yield of spring linseed (Linum usitatissimum), 1988-1998. Annals of Applied Biology 136, 197-207;
* Plăcintă DD & Murariu D (2016) Fungus evaluation from seeds germplasm before medium and long term storage. Cercetări Agronomice în Moldova 49, 71-82;
* Pristchepa L, Voitka D, Kasperovich E & Stepanova N (2006) Influence of Trichodermin-BL on the decrease of fiber flax infection by diseases and the improvement of ITS production quality. Journal of Plant Protection Research 46, 97-102;