EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION
ЕВРОПЕЙСКАЯ И СРЕДИЗЕМНОМОРСКАЯ ОРГАНИЗАЦИЯ ПО КАРАНТИНУ И ЗАЩИТЕ РАСТЕНИЙ
ORGANIZATION EUROPEENNE ET MEDITERRANEENNE POUR LA PROTECTION DES PLANTES

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PPM 8.8

PEST RISK ASSESSMENT SCHEME

Organism:	***Erysiphe* cf. *euphorbiicola (Oidium sp.)***
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Date:	**2004/03/04**
Approximate time spent on the assessment	**50 hours**

PEST RISK ASSESSMENT

STAGE 1: INITIATION **Identify pest** *This section examines the identity of the pest to ensure that the assessment is being performed on a real identifiable organism and that the biological and other information used in the assessment is relevant to the organism in question.*		
1. Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank? *if yes go to 3* *if no go to 2*	**Yes**	*Erysiphe* cf. *euphorbiicola* (*Oidium* sp.)Braun Ascomycota: Erysiphales
2. Attempt to redefine the taxonomic entity so that the criteria under 1 are satisfied. Is this possible? *if yes go to 3* *if no go to 22*		
The PRA area *The PRA area can be a complete country, several countries or part(s) of one or several countries*		
3. Clearly define the PRA area. *go to 4*		Germany
Earlier analysis *The pest, or a very similar pest, may have been subjected to the PRA process before, nationally or internationally. This may partly or entirely replace the need for a new PRA.*		
4. Does a relevant earlier PRA exist? *if yes go to 5* *if no go to 7*	**No**	
5. Is the earlier PRA still entirely valid, or only partly valid (out of date, applied in different circumstances, for a similar but distinct pest)? if entirely valid End if partly valid go to 6 if not valid go to 7		
6. Proceed with the assessment, but compare as much as possible with the earlier assessment. *go to 7*		

STAGE 2: PEST RISK ASSESSMENT **Section A: Pest categorization (qualitative criteria of a quarantine pest)**		
Geographical criteria *This section considers the geographic distribution of the pest in the PRA area.*		
7. Does the pest occur in the PRA area? *if yes go to 8* *if no go to 9*	**No**	The pest has been observed on poinsettia in few instances under protected conditions in companies producing pot plants for retailing. It is supposed that the pest was introduced with latently infected cuttings.
8. Is the pest of limited distribution in the PRA area? *Note: "of limited distribution" means that the pest has not reached the limits of its potential range either in the field or in protected conditions; it is not limited to its present distribution by climatic conditions or host-plant distribution. There should be evidence that, without phytosanitary measures, the pest would be capable of additional spread.* *if yes go to 18* *if no go to 22*		
Potential for establishment *For the pest to establish, it must find a widely distributed host plant in the PRA area (do not consider plants which are accidental/very occasional hosts or recorded only under experimental conditions). If it requires a vector, a suitable species must be present or its native vector must be introduced. The pest must also find environmental conditions suitable for survival, multiplication and spread, either in the field or in protected conditions.*		
9. Does at least one host plant grow to a substantial extent in the PRA area, in the open, in protected conditions or both? *if yes go to 10* *if no go to 22*	**Yes**	*Euphorbia pulcherrima* is a major crop for nurseries producing pot plants. Approximately 26 million poinsettias are produced each year in Germany. *E. pulcherrima* is grown exclusively under protected conditions, it can not overwinter under the climatic conditions in the PRA area.
10. Does the pest have to pass part of its life cycle on a host plant other than its major host (i.e. obligate alternate host plant)? *if yes go to 11* *if no go to 12*	**No**	
11. Does the alternate host plant also occur in the same part of the PRA area as the major host plant ? *if yes go to 12* *if no go to 22*		

12. Does the pest require a vector (i.e. is vector transmission the only means of dispersal)? *if yes go to 13* *if no go to 14*	**No**	
13. Is the vector (or a similar species which is known or suspected to be a vector) present in the PRA area or likely to be introduced. If in doubt, a separate assessment of the probability of introduction of the vector (in section B1) may be needed? *if yes go to 14* *if no go to 22*		
14. Does the known geographical distribution of the pest include ecoclimatic zones comparable with those of the PRA area? *if yes go to 18* *if no go to 15*	**No**	The climatic conditions (outdoors) where the pest is known to occur are different from those in the PRA area.
15. Is it probable, nevertheless, that the pest could survive and thrive in a wider ecoclimatic zone that could include the PRA area? *if yes go to 18* *if no go to 16*	No	The climatic range of the pest is closely related to the main host plant. Under the climatic conditions of Germany *E. pulcherrima* can not be cultivated outdoors.
16. Could the ecoclimatic requirements of the pest be found in protected conditions in the PRA area? *if yes go to 17* *if no go to 22*	Yes	Especially in fall when temperatures are favourable for development of the pest (15-23°C) and light intensity is low.
17. Is a host plant grown in protected conditions in the PRA area? *if yes go to 18* *if no go to 22*	Yes	*E. pulcherrima* is a major crop produced under protected conditions.

Potential economic importance		
Economic impact principally concerns direct damage to plants but may be considered very broadly, to include also social and environmental aspects. The effect of the presence of the pest on exports from the PRA area should also be allowed for. *In deciding whether economically important damage or loss to plants may occur, it is necessary to consider whether climatic and cultural conditions in the PRA area are conducive to damage expression, which is not always the case even if both host and pest survive under these conditions.* *Note: when performing a PRA on a pest that is transmitted by a vector, consider also any possible damage that the vector may cause.*		
18. With specific reference to the host plant(s) which occur(s) in the PRA area, and the parts of those plants which are damaged, does the pest in its present range cause significant damage or loss? *if yes go to 21* *if no go to 19*	**No**	There is some uncertainty about the damage caused by the pest in its present range as there is no relevant information available.
19. Could the pest, nevertheless, cause significant damage or loss in the PRA area, considering ecoclimatic and other factors for damage expression? *if yes go to 21* *if no go to 20*	**Yes**	Powdery mildew could cause significant damage when it is detected rather late at a time when secondary infections have already taken place. The spread of the fungus can be very fast when the climatic conditions are favourable for sporulation and dissemination. This is the case in fall at temperatures between 15 and 23°C and low light intensity.
20. Would the presence of the pest cause other negative economic impacts (social, environmental, loss of export markets)? *if yes go to 21* *if no go to 22*		
21. This pest could present a risk to the PRA area **Go To Section B**		
22. This pest does not qualify as a quarantine pest for the PRA area and the assessment can stop *However, if this is the first time that the decision-making scheme has directed you to this point, it may be worth returning to the question that led you here and continuing through the scheme in case the remaining questions strongly indicate categorization as a possible quarantine pest. In this latter case, seek a second opinion to decide whether the answers which led you to this point could be given a different reply.*		

<u>Section B</u>: Quantitative evaluation

The second part of the risk assessment process firstly estimates the probability of the pest being introduced into the PRA area (its entry and establishment) and secondly makes an assessment of the likely economic impact if that should happen. From these two aspects, it should be possible to consider the level of "pest risk" presented by the pest; this can then be used in the pest risk management phase to decide whether it is necessary to take phytosanitary measures to prevent the introduction of the pest, or if the measures chosen are appropriate for the level of risk. The questions in this section require an evaluation from minimum probability or impact (1) to maximum probability or impact (9). This must be done by an expert who can make an estimate according to the information provided (following the format of the check-list of EPPO (OEPP/EPPO, 1993a) and also according to comparison with other pests.
Answer as many of the following questions as possible, insofar as they are relevant to the pest concerned. If you cannot answer a particular question, do not give any score. Note whether this is because of lack of information or because the question is irrelevant to the pest concerned.

Questions marked with an asterisk (*) *are to be considered as more important than the others in the same section.*

1. Probability of introduction
Introduction, as defined by the FAO Glossary of Phytosanitary Terms, is the entry of a pest resulting in its establishment.

Entry

List the pathways that the pest could be carried on. *<u>Note</u>: a pathway can be any form of human activity that could transport the pest from a particular origin: e.g. plants and plant products moving in trade, any other traded commodity, containers and packing, ships, planes, trains, road transport, passengers, mail, etc. Note that similar means of pest transport from different origins can present greatly different probabilities of introduction, depending on the concentration of the pest in the area of origin. The pathways given should be only those already in operation, or proposed.*		Latently infected cuttings of *Euphorbia pulcherrima* from infected motherplants coming from an area where the pest is known to occur (Mexico, USA, Puerto Rico).
1.1 How many pathways could the pest be carried on? *few = 1* *many = 9*	1	See above. The volume of trade for cuttings of *E. pulcherrima* from countries where the pest occurs was 1 to 3% of the whole amount of imports into Germany (app. 25 Mio cuttings from Third Countries).
1.2 For each pathway, starting with the most important pathway identified above (i.e. that which carries the greatest trade or which is most likely to act as a means of introduction) and then in descending order of importance, answer questions 1.3 – 1.13. If one of the questions 1.3a, 1.5a, 1.7a or 1.12a is answered by 'no', the pathway could not act as a means of entry for the pest, and the scheme will return directly to this point, omitting later questions. Use expert judgement to decide how many pathways to consider. ***Go to 1.3***		

1.3a Could the pest be associated with the pathway at origin? *Note: does the pest occur in the area of origin? Is the pest in a life stage which would be associated with commodities, containers, or conveyances?* *if yes go to 1.3b* *if no go to 1.2*	Yes	The pest occurs in USA, Mexico, Puerto Rico. In these areas motherplants for the production of poinsettia cuttings are cultivated.
1.3b How likely is the pest to be associated with the pathway at origin? [i.e. are all areas infested or highly infested; will every consignment or part of it be infested?] *not likely = 1* *very likely = 9*	5	There are some references on the occurrence in the USA but exact information on the degree of infestation is not available. In 1992 over a hundred growers across the USA were affected. Since that time, the disease has appeared sporadically in North American greenhouses.
1.4 Is the concentration of the pest on the pathway at origin likely to be high? [i.e. will there be many individuals associated with the consignment?] *not likely = 1* *very likely = 9*	3	Difficult to assess.
1.5a Could the pest survive existing cultivation or commercial practices? *Note: these are practices mainly in the country of origin, such as pesticide application, removal of substandard produce, kiln-drying of wood.* *if yes go to 1.5b* *if no go to 1.2*	Yes	The pest could survive in case of insufficient fungicide application.
1.5b How likely is the pest to survive existing cultivation or commercial practices? *not likely = 1* *very likely = 9*	5	In countries of origin a survival is more likely than in the PRA area.
1.6 How likely is the pest to survive or remain undetected during existing phytosanitary procedures? *Note: existing phytosanitary measures (e.g. inspection, testing or treatments) are most probably being applied as a protection against other (quarantine) pests; the assessor should bear in mind that such measures could be removed in the future if the other pests were to be re-evaluated.* *The likelihood of detecting the pest during inspection or testing will depend on a number of factors including:* • *ease of detection of the life stages which are likely to be present. Some stages are more readily detected than others, for example insect adults may be more obvious than eggs;* • *location of the pest on the commodity. Surface feeders are more readily detected than internal feeders;*	9	It is rather likely that the pest remains undetected. Powdery mildew infection may be latent as a consequence of fungicide treatment of the motherplants in the country of origin. Fungicide treatment causes a delay of sporulation. Mycelium of powdery mildew not yet sporulating is not visible to the naked eye and thus remains undetected during phytosanitary inspection of the cuttings at import. Non sporulating mycelium can be detected only by means of microscopy on the surface of the leaves at a magnification 50 x but this procedure is very time consuming.

• *symptom expression - many diseases may be latent for long periods, at certain times of the year, or may be without symptoms in some hosts or cultivars and virulent in others;* • *distinctiveness of symptoms - the symptoms might resemble those of other pests or sources of damage such as mechanical or cold injury;* • *the intensity of the sampling and inspection regimes;* • *distinguishing the pest from similar organisms.* *not likely = 1* *very likely = 9*		
1.7a Could the pest survive in transit? *Note: consideration should be given to:* • *speed and conditions of transport;* • *vulnerability of the life-stages likely to be transported;* • *whether the life cycle is of sufficient duration to extend beyond time in transit;* • *the number of individuals likely to be associated with a consignment.* *Interception data can be used to estimate the ability of a pest to survive in transit.* *if yes go to 1.7b* *if no go to 1.2*	Yes	
1.7b How likely is the pest to survive in transit? *not likely = 1* *very likely = 9*	9	
1.8 Is the pest likely to multiply during transit? *not likely = 1* *very likely = 9*	1	Conditions for sporulation are unfavourable during transit.
1.9 How large is movement along the pathway? [i.e. how much trade?] *not large = 1* *very large = 9*	2	About 1 to 3% of poinsettia cuttings imported into Germany are coming from areas where *Oidium* sp. is known to occur.
1.10 How widely is the commodity to be distributed throughout the PRA area? *Note: the more scattered the destinations, the more likely it is that the pest might find suitable habitats.* *not widely = 1* *very widely = 9*	9	The primary destinations for the cuttings are only a few companies which are specialized on the rooting of the cuttings. But after rooting young plants are scattered throughout the PRA area among companies producing for retail marketing.

1.11 How widely spread in time is the arrival of different consignments? *Note: introduction at many different times of the year will increase the probability that entry of the pest will occur at a life stage of the pest or the host suitable for establishment.* *not widely = 1* *very widely = 9*	3	As poinsettia is a typical Christmas crop the time of arrival of cuttings is limited. The main time for arrival of relevant consignments is from June to August.
1.12a Could the pest transfer from the pathway to a suitable host? *Note: consider innate dispersal mechanisms or the need for vectors, and how close the pathway on arrival is to suitable hosts.* *if yes go to 1.12b* *if no go to 1.2*	Yes	If latently infected poinsettia cuttings are cultivated together with non infected ones there is a risk that, if starting of sporulation remained undetected, the pest will spread to plants which previously were free of the pest.
1.12b How likely is the pest to be able to transfer from the pathway to a suitable host? *not likely = 1* *very likely = 9*	5	*Euphorbia pulcherrima* is a suitable host. Transfer from the pathway can only occur, when the climatic conditions are favourable for sporulation, disseminaton and germination of conidia. Climatic conditions are favourable in fall under protected conditions. This might be the reason why until now the pest occurred only in companies for retailing and not in rooting companies.
1.13 Is the intended use of the commodity (e.g. processing, consumption, planting, disposal of waste) likely to aid introduction? *Note: consider whether the intended use of the commodity would destroy the pest or whether the processing, planting or disposal might be done in the vicinity of suitable hosts.* *not likely = 1* *very likely = 9*	9	The intended use of the cuttings is the production of poinsettia pot plants for use of the final consumer.
Sum of scores for entry	61	
Number of questions answered	12	
Mean	**5,1**	
Establishment		
1.14 How many host-plant species are present in the PRA area? *one or very few = 1* *many = 9*	2	The major host in the PRA area is *Euphorbia pulcherrima* but *Oidium* sp. from poinsettia can also attack *E. helioscopia* and *E. exigua* (experimental hosts)
1.15 How extensive are the host plants in the PRA area? *rare = 1* *widespread = 9*	9	*E. pulcherrima* is cultivated only under protected conditions. It is a seasonal crop cultivated nearly in each company from August to December. *E. helioscopia* and *E. exigua* are annual weeds in agricultural areas.

1.16 If an alternate host is needed to complete the life cycle, how extensive are such host plants in the PRA area? *rare = 1* *widespread = 9*		Not applicable

1.17 *If a vector is needed for dispersal, how likely is the pest to become associated with a suitable vector? *Note: is the vector present in the PRA area, could it be introduced or could another vector be found?* *not likely = 1* *very likely = 9*		Not applicable
1.18 Has the pest been recorded on crops in protected conditions elsewhere? (Answer this question only if protected cultivation is important in the PRA area.) *no = 1* *often = 9*	2	Denmark, United Kingdom (both only in rare instances)
1.19 How likely are wild plants (i.e. plants not under cultivation, including weeds, volunteer plants, feral plants) to be significant in dispersal or maintenance of populations? *not likely = 1* *very likely = 9*	2	The experimental hosts *E. helioscopia* and *E. exigua* are annual weeds. Therefore maintenance of the powdery mildew population outdoors is unlikely. The significance under protected conditions is not known but nurseries should be kept free from any kind of weeds.
1.20 *How similar are the climatic conditions that would affect pest establishment in the endangered area and in the area of origin? *Note: the climatic conditions in the PRA area to be considered may include those in protected cultivation.* *not similar = 1* *very similar = 9*	9	In protected cultivation the climatic conditions in fall may be similar to those in the area of origin.
1.21 How similar are other abiotic factors in the PRA area and in the area of origin? *Note: the major abiotic factor to be considered is soil type; others are, for example, environmental pollution, topography/orography.* *not similar = 1* *very similar = 9*		Not applicable
1.22 How likely is the pest to have competition from existing species in the PRA area for its ecological niche? *very likely = 1* *not likely = 9*	9	*Oidium* sp. is the only known powdery mildew on poinsettia in Germany. The native *Podosphaera euphorbiae* which infects perennials of the genus *Euphorbia* doesn't attack poinsettia as demonstrated in inoculation experiments (Brielmaier-Liebetanz, unpublished data).
1.23 How likely is establishment to be prevented by natural enemies already present in the PRA area? *very likely = 1* *not likely = 9*	9	No natural enemies of *Oidium* sp. on poinsettia are known.

1.24 *If there are differences in the crop environment in the PRA area to that in the area of origin, are they likely to aid establishment? *Note: factors that should be considered include time of year that the crop is grown, soil preparation, method of planting, irrigation, whether grown under protected conditions, surrounding crops, management during the growing season, time of harvest, method of harvest, etc.* *not likely = 1* *very likely = 9*	1	In some areas of origin poinsettias are grown year-round as landscape ornamentals. In the PRA area *E. pulcherrima* is only a seasonal crop and never grown outdoors.
1.25 Are the control measures which are already used against other pests during the growing of the crop likely to prevent establishment of the pest? *very likely = 1* *not likely = 9*	9	Usually in the poinsettia crop fungicides are not applied against leaf diseases.
1.26 *Is the reproductive strategy of the pest and duration of life cycle likely to aid establishment? *Note: consider characteristics which would enable the pest to reproduce effectively in a new environment, such as parthenogenesis/self-crossing, duration of the life cycle, number of generations per year, resting stage, etc.* *not likely = 1* *very likely = 9*	1	Sexual reproduction is not known to occur on poinsettia. The fungus spreads via conidia. There are no resting stages, survival in the greenhouse in absence of *E. pulcherrima* is therefore very unlikely except for possible presence of weeds like *E. helioscopia* and *E. exigua*.
1.27 How likely are relatively low populations of the pest to become established? *not likely = 1* *very likely = 9*	1	Even for a short time establishment within one cultivation period high populations are necessary because viability of conidia is very limited. High populations are only present when primary infections are not detected in time, and secondary infections have already taken place. A longterm establishment under protected conditions is very unlikely because no conidia inoculum from outdoors is introduced, poinsettia is not a year-round crop and there will be no survival of the pest outside the greenhouse.
1.28 How probable is it that the pest could be eradicated from the PRA area ? *very likely = 1* *not likely = 9*	1	A successful eradication is possible, when scouting is done very carefully. Fungicide application at the first signs of powdery mildew infestation will prevent secondary infections and spread of the fungus will be stopped. Furthermore poinsettia is not a year-round crop, the fungus wouldn't survive in absence of the host plant.
1.29 How genetically adaptable is the pest? *Note: is the species polymorphic, with, for example, subspecies, pathotypes? Is it known to have a high mutation rate? This genotypic (and*	3	*Oidium* sp. on poinsettia seems to be specialized on very few species of the genus *Euphorbia*. Therefore an overcome of host resistance is unlikely. High mutation rate is unlikely as well,

phenotypic) variability facilitates the pest's ability to withstand environmental fluctuations, to adapt to a wider range of habitats, to develop pesticide resistance and to overcome host resistance. *not adaptable = 1* *very adaptable = 9*		because of the absence of a sexual stage on poinsettia. The danger for development of pesticide resistance is not high, because of several reasons: As poinsettia is a seasonal crop, there is no year-round spraying program. Preventive applications are not necessary when monitoring is done. In case of an outbreak contact fungicides can be applied alternately to systemic fungicides.

1.30 *How often has the pest been introduced into new areas outside its original range? *Note: if this has happened even once before, it is important proof that the pest has the ability to pass through most of the steps in this section (i.e. association with the pathway at origin, survival in transit, transfer to the host at arrival and successful establishment). If it has occurred often, it suggests an aptitude for transfer and establishment.* *never = 1* *often = 9*	1	There have been only few findings of the pest in pot plant producing companies in DK and UK. In Germany there were 5 outbreaks in 2001 and again some outbreaks in 2003. None of these outbreaks resulted in the establishment of the pest.
Sum of scores for establishment	59	
Number of questions answered	14	
Mean	**4,2**	

2. Economic Impact Assessment

Identify the potential hosts in the PRA area, noting whether wild or cultivated, field or glasshouse. Consider these in answering the following questions. When performing a PRA on a pest that is transmitted by a vector, consider also any possible damage that the vector may cause.
According to the pest and host(s) concerned, it may be appropriate to consider all hosts together in answering the questions once, or else to answer the questions separately for specific hosts.

Note that, for most pest/crop/area combinations, precise economic evaluations are lacking. In this section, therefore, expert judgement is asked to provide an evaluation of the likely scale of impact. Both long-term and short-term effects should be considered for all aspects of economic impact.

2.1 *How important is economic loss caused by the pest within its existing geographic range? *little importance = 1* *very important = 9*	4	Little information is available on the economical loss in countries of origin. In 1992 there was the first report on an outbreak in USA, when over a hundred growers were affected by powdery mildew. Since that time powdery mildew on poinsettia seems to occur only sporadically.
2.2 How important is environmental damage caused by the pest within its existing geographic range? *Note: environmental damage may be impact on ecosystem health, such as effects on endangered/threatened species, keystone species or biodiversity.* *little importance = 1* *very important = 9*	1	Damage is limited to *E. pulcherrima*
2.3 How important is social damage caused by the pest within its existing geographic range?	1	None reported

Note: social effects could be, for example, damaging the livelihood of a proportion of the human population, or changing the habits of a proportion of the population (e.g. limiting the supply of a socially important food). *little importance = 1* *very important = 9*		
2.4 *How extensive is the part of the PRA area likely to suffer damage from the pest? *Note: the part of the PRA area likely to suffer damage is the endangered area, which can be defined ecoclimatically, geographically, by crop or by production system (e.g. protected cultivation).* *very limited = 1* *whole PRA area = 9*	9	In case of using latently infected plant material most companies for retail marketing of poinsettias could be affected throughout the whole PRA area because the crop is cultivated under protected conditions.
Spread potential is an important element in determining how fast economic impact is expressed and how readily a pest can be contained.		
2.5 *How rapidly is the pest liable to spread in the PRA area by natural means? *very slowly = 1* *very rapidly = 9*	1	Natural spread could occur only by the dissemination of the conidia. There is no information on a long distance dissemination of conidia of the pest.
2.6 How rapidly is the pest liable to spread in the PRA area by human assistance? *very slowly = 1* *very rapidly = 9*	3	Introduction of the pest into the PRA area occurs mainly with latently infected cuttings. These are usually distributed to few nurseries engaged in rooting of the cuttings and production of young plants. Due to the cultural conditions during the rooting period there will be no sporulation and therefore no further spread to neighbouring, not yet infected plots. When trading latently infected young plants within the PRA area powdery mildew infection becomes obvious when they are cultivated in companies for retail marketing. At this stage the climatic conditions are conducive for sporulation and spread within the crop may occur.
2.7 How likely is it that the spread of the pest could be contained within the PRA area? *Note: consider the biological characteristics of the pest that might allow it to be contained in part of the PRA area; consider the practicality and costs of possible containment measures.* *very likely = 1* *not likely = 9*	1	Good management measures can help to prevent the spread of the pest. When scouting for signs of powdery mildew is carefully done throughout the growing season infestation will be detected in an early stage and chemical control can be used to manage the disease. Survival of the pest outdoors is not possible and very unlikely under protected conditions.
2.8 *Considering the ecological conditions in the PRA area, how serious is the direct effect of the pest on crop yield and/or quality likely to be?	8	If the plants are infected considerable damage is expected on the crop cultivated under protected conditions. The damage will mainly affect companies producing the final pot plants.

<u>Note</u>: the ecological conditions in the PRA area may be adequate for pest survival but may not be suitable for significant damage on the host plant(s). Consider also effects on non-commercial crops, e.g. private gardens, amenity plantings. *not serious = 1* *very serious = 9*		Infected plants are not marketable because of the presence of powdery mildew on leaves and bracts.
2.9 How likely is the pest to have a significant effect on producer profits due to changes in production costs, yields, etc., in the PRA area? *not likely = 1* *very likely = 9*	8	In case of an outbreak of powdery mildew which is not detected in an early stage significant effects on the profit are likely because plants are not marketable. If it is detected in time there are additional costs for fungicide application.

2.10 How likely is the pest to have a significant effect on consumer demand in the PRA area? *Note: consumer demand could be affected by loss in quality and/or increased prices.* *not likely = 1* *very likely = 9*	1	Outbreaks of powdery mildew usually become obvious in fall during production of the final pot plants. If infestation is detected in time, chemical control is successful, otherwise the plants are not marketable and will be destroyed. The final consumer is not affected directly by the pest. If there are only a few outbreaks prices will not be affected.
2.11 How likely is the presence of the pest in the PRA area to affect export markets? *Note: consider the extent of any phytosanitary measures likely to be imposed by trading partners.* *not likely = 1* *very likely = 9*	2	Until now powdery mildew on poinsettia has been detected only in companies producing pot plants for retail marketing. Export of finished plants of *E. pulcherrima* is of minor importance.
2.12 How important would other costs resulting from introduction be? *Note: costs to the government, such as research, advice, publicity, certification schemes; costs (or benefits) to the crop protection industry.* *little importance = 1* *very important = 9*	3	Official advice, control measures, research
2.13 How important is the environmental damage likely to be in the PRA area? *little importance = 1* *very important = 9*	1	No environmental damage is presently known or expected.
2.14 How important is the social damage likely to be in the PRA area? *little importance = 1* *very important = 9*	1	No social damage is presently known or expected.
2.15 How probable is it that natural enemies, already present in the PRA area, will affect populations of the pest if introduced? *very likely = 1* *not likely = 9*	9	No natural enemies of *Oidium* sp. on poinsettia are known
2.16 How easily can the pest be controlled? *Note: difficulty of control can result from such factors as lack of effective plant protection products against this pest, occurrence of the pest in natural habitats or amenity land, simultaneous presence of more than one stage in the life cycle, absence of resistant cultivars).* *easily = 1* *with difficulty = 9*	1	Effective fungicides are available. The pest can be easily controlled, when fungicides are applied in time, i.e. when secondary infections have not yet taken place.

2.17 How likely are control measures to disrupt existing biological or integrated systems for control of other pests? *not likely = 1* *very likely = 9*	1	In the production of poinsettia biological control is commonly applied against whiteflies. Registered fungicides effective against powdery mildew usually do not affect the beneficial organisms.
2.18 How likely are control measures to have other undesirable side-effects (for example on human health or the environment)? *not likely = 1* *very likely = 9*	1	When registered fungicides are used for control undesirable side-effects are unlikely. The amount of fungicide applications against powdery mildew until now is marginal.
2.19 Is the pest likely to develop resistance to plant protection products? *not likely = 1* *very likely = 9*	1	As the pest currently occurs only sporadically there are only few targeted applications necessary. No preventive spraying program is run. Under these conditions the risk to develop resistance seems to be very low.
Sum of scores for economic impact	57	
Number of questions answered	19	
Mean	**3,0**	
After completing this section, the assessor should comment on whether sufficient information exists to trust the answers given; or if he/she knows of other relevant factors that have not been considered in this evaluation		

3. Final Evaluation

At the end of the procedure, the assessor will have at his disposal:
(1) one or several sets of replies (1-to-9 scores) to questions 1.1-1.13, for one or several pathways (if no pathways have been retained, the probability of introduction will be zero);
(2) one set of replies (1-to-9 scores) to questions 1.14-1.30;
(3) one or several sets of replies (1-to-9 scores) to questions 2.1-2.19, for single, grouped or separate hosts (according to the manner of answering which has been chosen).

The assessor should first consider the quality and quantity of the information used to answer the questions, and give an overall judgement of how reliable the pest risk assessment can be considered. If other relevant information is available that has not been considered, this should be noted.

By the means of his choice, the assessor should attempt to make a separate estimate of the probability of introduction of the pest and its probable level of economic impact. As explained in the introduction, these estimates cannot, on the basis of the procedure used in the scheme, be expressed in absolute units. The numerical scores may be combined, weighted and averaged in appropriate ways that may enable the assessor who uses them consistently to make useful comparisons between pests, pathways and hosts. No particular mode of calculation is specifically recommended by EPPO. Certain questions have been identified as more important than others, and the assessor should take due account of this.

The assessor may then combine his estimates of probability of introduction and probable economic impact to formulate a single estimate of pest risk. This may usefully be compared with one or several reference levels of risk to decide whether the pest should be considered to be a quarantine pest, so that phytosanitary measures should be taken against it.

Finally, the scores given in answer to the different sections (particularly that on pathways) may be used again in pest risk management.

3. Final evaluation

Evaluation of available information and major uncertainties

The information on biology and spread of the pest seems to be sufficient for a reliable risk assessment.

Information on the importance of the pest in its current range of distribution is sparse. Exact data on economic losses induced to poinsettia production in North America are not available. This insufficient information affects the reliability of estimations on possible economic effects in the PRA area. Information from the previous outbreaks in Germany (and EU Member States) shows that the damage is highly depending on the time of getting aware of the infection within the holding. In case of early detection of the first symptoms effective control measures are possible thus preventing further symptom development and minimizing the economic loss. If the infestation is detected at a late stage already affecting the bracts damage may be high as those plants are not marketable.

The area of this PRA is confined to Germany where the pest is restricted exclusively to the production of *E. pulcherrima* under protected conditions and establishment of the pest is very unlikely either in glasshouses or outdoors. The risk for establishment may be different in case of introductions of the pest into Southern European countries where host plants might be grown throughout the year in the open.

Estimate of pest risk

Possibility of entry and establishment: *Oidium* sp. is native to North America and does not occur in the PRA area. Up to now it is also not known to occur in the EU or EPPO region. There have been few outbreaks in the previous years with growers producing pot plants of *E. pulcherrima* for retail marketing. The reason for these outbreaks is most probably the import of latently infected cuttings from areas where the pest is known to occur. Those imports of latently infected cuttings are considered to be the only pathway for introduction of this pest into the PRA area. The probability of infestation of consignments of cuttings coming from countries where the pest is known to occur is difficult to assess. But as there is very few trade of cuttings coming from Mexico, Puerto Rico and USA (about 1 to 3% of the total amount of *E. pulcherrima* cuttings imported into Germany) the probability of entry of *Oidium* sp. into the PRA area is considered to be low. Even though the pest could enter the PRA area it is very unlikely that powdery mildew of poinsettia will become established as under the climatic conditions in Germany it can only survive under protected cultivation. But also under protected cultivation only short-term establishment will be expected because of lack of the respective host plants. *E. pulcherrima* is a season crop produced exclusively for trade at Christmas time.

Probable level of economic impact: The economic impact of *Oidium* sp. to the production of poinsettia in the PRA area is estimated to be low. Due to the cultural conditions the damage will mainly become evident at the final stage of the production chain. High losses can be expected only if primary

infections are not recognized in an early stage. If spread of the fungus within the crop is already running the whole plant (including the bracts) is affected and plants are not marketable. This 'worst case' can be avoided if the crop is regularly checked for presence of the first symptoms and effective fungicides are applied without delay in order to prevent further spread. Those fungicides are available.

Conclusions

Taking into account the low risk of entry of the pest, the improbability of the pest to become established in the PRA area (even not under protected conditions) and the availability of effective control measures, *Oidium* sp. should not be considered a quarantine pest.

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