## Summary Pest Risk Analysis for PHSI interceptions

**Name of organism and disease:** *Xanthomonas axonopodis* pv. *poinsettiicola*
**Date of PRA production, or revision and revision number:** January 17th 2007
**Reason for Pest Risk Analysis:** Second (of 6) interception(s) of the pathogen

| **Pest Risk Analysis:** | |
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| **Question** | **Answer** |
| **1. Name of pest:** | |
| **1. (a) Bacteria** | |
| Anamorph: Genus, species, var., f.sp. | *Xanthomonas axonopodis* pv. *poinsettiicola* |
| Common name for disease | Bacterial leaf spot of poinsettia |
| Special notes on taxonomy or nomenclature | This species is also known as *Xanthomonas campestris* pv. *poinsettiicola*. Vauterin *et al*. (1995) reclassified *Xanthomonas campestris* pv. *poinsettiicola* strains into three separate species: *Xanthomonas axonopodis* pv. *poinsettiicola*, *Xanthomonas arboricola* pv. *poinsettiicola* and *Xanthomonas codiaei*. The basis for this reclassification is DNA : DNA homology supported by the ability of *X. arboricola* pv. *poinsettiicola* to metabolise quinate and for *X. codiaei* to cause disease on *Codiaeum variegatum*.<br><br>DNA sequencing of the gyrase B gene shows that isolates from all of the 2006 UK interceptions (six in total) match the type strain held for *Xanthomonas axonopodis* pv. *poinsettiicola* in the National Collection of Plant Pathogenic Bacteria held at CSL. Gyrase B sequences are expected to be different between species.<br><br>The classification of *Xanthomonas axonopodis* and its many pathovars is complex and as yet not wholly resolved. Additionally there are other *Xanthomonas* pathovars which are not yet adequately classified but known to cause disease on other Euphorbiaceae including *Euphorbia pulcherrima.* (D. Stead, CSL, *personal communication*).<br><br>Nevertheless this PRA refers to strains that are presently associated with the name *X. axonopodis* pv. *poinsettiicola.* |
| Primary pathogen (Y/N) | Yes |
| Weak pathogen (Y/N) | No |
| Saprophyte (Y/N) | No |

**2. (ai) Does it occur in the UK?**
The pathogen is not considered to occur in the UK.

**(aii) Has it been intercepted before on this host in the UK (check "pathdiary")?**
The pathogen has been intercepted six times in the UK since July 2006. On all occasions it was found on the leaves of *Euphorbia pulcherrima* representing several different cultivars. The pathogen was isolated from leaf spots and the incidence of infected plants ranged from 0.5% to 30%. All interceptions could be traced to one supplier from the Netherlands who had originally sourced the plants from Brazil, Zimbabwe and an unknown or unknown locations.

**(aiii) Has it been recorded before on this host in the UK?** ?
No.

**2(b). Is there any other reason to suspect that the pest is already established in the UK?**
No.

**3. EC Directive Status?** Not listed.

**4. EPPO Status?** The organism was added to the EPPO Alert List in 2004.

**5. What are its host plants?**
*Xanthomonas axonopodis* pv. *poinsettiicola* has only ever been reported on species of the Euphorbiaceae family (spurges). Species reported to be naturally infected are *Euphorbia pulcherrima* (poinsettia), *Euphorbia heterophylla* (wild poinsettia), *Euphorbia milii* (crown-of-thorns) and *Codiaeum variegatum* (croton) (Bradbury, 1986; CABI, 2006).

Patel *et al*. (1951) tested the susceptibility of *Manihot esculenta* (cassava) under experimental conditions to their original Indian isolate obtained from *E. pulcherrima* in 1950 but this did not lead to infection and disease development. Later, Sabet *et al*. (1969) used the same isolate and re-tested *M. esculenta* and found it to be susceptible to infection. The reason for the different results is not clear.

When the disease was discovered on poinsettia in Florida in the 1960s, experimental data indicated that many popular cultivars of poinsettia were highly susceptible to the pathogen (Benson *et al*., 2001; EPPO, 2006). Differences in the susceptibilities between cultivars of croton have also been observed in experiments (Chase, 1985).

**5 (a). Highlight crop plants grown commercially, including those of environmental or amenity value, in the UK (and EU/EPPO) (include figures for potential yield/quality losses).**
All natural host species of the pathogen belong to the Euphorbiaceae family. Several wild species of the Euphorbiaceae are present in Britain and Europe (Preston *et al*., 2002; Flora Europea, undated) but none have been reported as hosts of the pathogen.

The most important commercial host is *E. pulcherrima* (poinsettia). This is a sub-tropical plant, which is native to Mexico and is often used as a floral Christmas pot plant. More than 100 commercial cultivars are presently available worldwide (Benson *et al*., 2001). Provisional figures for production in England and Wales in 2005 show that 4.8 million poinsettia pot plants were produced with a total value of £8,597,000. Poinsettia production was reportedly higher prior to 2005, with a peak value of £12,480,000 in

2000 (Anon., 2006).

As poinsettia is an ornamental plant, the leaf spotting and leaf loss caused by this disease would affect its retail value and possibly saleability. Leaf spots are brown to black in colour and may be surrounded by a pale green to yellow coloured halo, these spots can coalesce to form large areas of blighted tissue and in severe cases, the leaves turn yellow and drop from the plant (Daughtrey *et al*., 1995). McFadden & Morey (1962) reported that the severity of leaf loss resulted in almost complete defoliation at the time of flowering in highly susceptible cultivars. No data are available for losses associated with specific outbreaks or from trials but unspecified commercial losses were reported from a 1960s Florida outbreak (Benson *et al*., 2001).

In the UK interceptions, leaf spotting on *E. pulcherrima* was observed. Infection ranged from an incidence of 0.5% up to 30%. Plants were destroyed under statutory action, but the severity of the leaf spotting in some instances was such that the plants would have had little retail value and would most likely have been destroyed by the grower.

Leaf spotting of *E. pulcherrima* was observed in an outbreak in Italy (Stravato *et al*., 2004), whilst leaf spotting and the abscission of severely infected leaves were observed in a German outbreak (Wohanka, 2004). No data on losses are reported for these outbreaks.

*Euphorbia milii* (crown-of-thorns) is also used as an ornamental plant although it is of less commercial importance than *E. pulcherrima*. It is native to Madagascar but is grown worldwide as an ornamental pot plant. Several UK suppliers are listed in the Royal Horticultural Society Plant Finder (RHS, 2006). Infection results in brown leaf spots with yellow halos and abscission of severely infected leaves is common (Chase, 1987). Although no specific data are available for percentage losses, the decrease in foliage quality would affect its retail value.

*Codiaeum variegatum* is also an ornamental plant, although its commercial importance in the UK is less significant than poinsettia, only two UK suppliers are known (RHS, 2006). *C. variegatum* is native to Asia. Infection results in leaf lesions, which would be likely to affect the retail value of the plant due to the loss in quality, although no specific data are available for percentage losses. Leaf lesions are typically 1 – 10 mm in diameter and are frequently dryish, tan in colour and with an irregular margin. Abscission of severely infected leaves is common (Chase, 1987).

**5 (a). continued.**

*Euphorbia heterophylla* (wild poinsettia) does not occur in the UK (Preston *et al*., 2002) and is native to North America (CABI, 2006). It is not grown as an ornamental plant and is considered to be a weed in crop fields in many countries worldwide. In Europe it is only present in Italy (CABI, 2006). *E. heterophylla* is not recorded elsewhere in Europe or the EPPO region (CABI, 2006; Flora Europea, undated).

*Manihot esculenta* (cassava) was found to be susceptible to the pathogen upon inoculation (Sabet *et al*., 1969). Moderate infection of leaves was observed although symptoms were not reported. *M. esculenta* is not grown as a food crop in Europe or the EPPO region (CABI, 2006) but it is an important crop plant in tropical and subtropical regions of the world.

**5 (b). Are any of the host plants of forestry importance?**

No.

**6. What is its present geographical distribution?**

In September 2003, the pathogen was found on one pot plant of *E. pulcherrima* in Hessen, Germany (Wohanka, 2004). It was also found in October 2003 on *E. pulcherrima* in Lazio, Italy (Stravato *et al*., 2004). These were believed to be the first reports of *X. axonopodis* pv. *poinsettiicola* in Europe. There have been six interceptions of the pathogen in the UK between July and November 2006. All the UK interceptions were on *E. pulcherrima* in nurseries and could be traced to one Netherlands-based supplier. Infected consignments were originally from Zimbabwe, Brazil or an unknown location or locations. Since the consignments were grown together in the Netherlands, it is not known whether the pathogen was originally from Zimbabwe, Brazil, the Netherlands or elsewhere. However, the pathogen has never been officially recorded in any of the named countries.

The pathogen was first described in India in 1950 (Patel *et al*., 1951) where leaf spotting was observed on *E. pulcherrima*. Further records in Asia include the Cocos Islands (territory of Australia) on an unspecified host (Bradbury, 1986), the Philippines on *E. pulcherrima* (Quimio, 1974) and also on *E. pulcherrima* in Taiwan (Lee *et al*., 2006). A bacterial disease with symptoms similar to those caused by *X. axonopodis* pv. *poinsettiicola* was observed on poinsettia leaves at a nursery in the Zhejiang province of China (Li *et al*., 2006a). Further analysis of the Chinese isolates indicated that they were *X. axonopodis* and they could be differentiated from the pathotype strain LMG849 originally from India by comparison of pathogenicity, substrate utilisation and BOX-PCR genomic fingerprints (Li *et al*., 2006b). It is unclear whether this strain from China is *X. axonopodis* pv. *poinsettiicola* or a related species.

The pathogen has been reported in the USA; in 1960 it was found on *E. pulcherrima* (McFadden & Morey, 1962) and in 1984 it was found on *C. variegatum* (Chase, 1985). It has also been reported on *E. milii* (Chase, 1987). These reports originate from Florida but there are no data on the distribution of the pathogen elsewhere in the USA.

The only country record in South America is Venezuela, where the pathogen was reported in 1996 on *E. pulcherrima* (Hernández & Trujillo, 1997).

In Oceania, the pathogen has been reported on *E. pulcherrima* in Queensland, Australia (Bradbury, 1986) and New Zealand (Hill, 1979).

**6 (a). Present in the EU?**

The pathogen has been reported on *E. pulcherrima* in Germany (Wohanka, 2004) and Italy (Stravato *et al*., 2004) and in 2006 was intercepted in the UK on *E. pulcherrima*. These are reported in detail above. It is assumed that the German and Italian outbreaks were eradicated as they were in the UK.

**6 (b). Present in the EPPO region?**

As above.

**7. Does it appear capable of establishing in the UK/EU/EPPO?**
**(a) outdoors?**

Unknown but possible.

Little is known about the epidemiology of *X. axonopodis* pv. *poinsettiicola* (EPPO, 2006). However, *Xanthomonas* species that cause leaf spots and blights on other hosts, such as *Xanthomonas axonopodis* pv. *dieffenbachiae* are known to spread by water splash,

(latently) infected plants, tools and clothes, plant debris including that found in soil and possibly nematodes (Janse, 2005). This is also likely to apply to *X. axonopodis* pv. *poinsettiicola*. It is not known whether the *X. axonopodis* pv. *poinsettiicola* is biologically capable of surviving outdoors.

*E. heterophylla* is the only reported natural host which is recorded as growing outdoors in Europe/EPPO. As a wild plant, it is native to North America but has been introduced elsewhere. In Europe, it is only reported to be present in Italy, where it is a weed in crop fields (CABI, 2006). It is possible that the host-range of this pathogen may be wider than that currently reported, also that it could survive in an epiphytic form on other Euphorbiaceae, including weed species (Stead, CSL, *personal communication*).

The pathogen has previously been reported causing disease outdoors. In the 1960s Florida outbreak, outdoor plantings of poinsettia were infected (EPPO, 2006). All other outbreaks (including those in Europe) have been under protected conditions. This might be expected as *E. pulcherrima*, *E. milii* and *C. variegatum* are usually cultivated under protected conditions worldwide.

For these reasons there is at least potential for this pathogen to establish outdoors.

**7 (b) on protected crops?**

The UK interceptions and almost all previously published outbreaks on *E. pulcherrima* were in nursery (protected) environments. Therefore the pathogen can be considered capable of establishing under protected environments in the UK, EU and EPPO region, particularly as there have already been instances of the pathogen causing disease on *E. pulcherrima* in Europe on protected crops.

The propagation and trade of *E. pulcherrima* is conducive to the pathogen being quickly transmitted throughout Europe. Cuttings of this particular host are usually produced outside Europe and are imported into Europe over the summer, where they are planted and grown-on in the autumn. Those destined for the UK are frequently imported indirectly, such as via the Netherlands. There is little direct propagation in the UK. The production of poinsettia is mainly for the Christmas season as pot plants. After these plants are sold the glasshouse space is used for other crops, thus giving a 'crop-break' free from the host. (P. Reed, CSL, *personal communication*).

**8. What is its potential likely to be as a pest in the UK/EU/EPPO?**

The pathogen has the potential to establish on protected crops of poinsettia and maybe other Euphorbiaceae grown commercially in the UK, EU and EPPO region. The pathogen is likely to produce infection in one season and may carry-over to cause infection in the next season if post-crop cleanup is inadequate. The pathogen has been reported to cause disease on Euphorbiaceae under protected conditions in several countries worldwide including on *E. pulcherrima* in Germany and Italy. The pathogen was also intercepted on symptomatic *E. pulcherrima* in the UK at several different nurseries.

The pathogen has the potential to establish outdoors on wild Euphorbiaceae including *E. heterophylla* and possibly other as yet unknown hosts.

For protected crops of poinsettia, no specific data are available on commercial losses

arsing from infection and disease but the pathogen was described as having caused commercial losses on *E. pulcherrima* in Florida in the 1960s (EPPO, 2006) and all known cultivars tested then were susceptible. In the UK interceptions, direct commercial losses may have occurred as in some instances, the infected plants were sufficiently damaged so as to make them unsuitable for sale (the plants were destroyed under statutory action anyhow). The incidence of infected plants observed ranged from 0.5 to 30%. The lack of scientific data on losses makes it difficult to predict potential commercial losses caused by the pathogen. However, leaf spotting and in some instances, abscission of infected leaves, have already been observed in Europe, hence it is likely that this pathogen could cause significant commercial losses in the UK, EU and EPPO region. Other ornamental hosts (*E. milii* and *C. variegatum)* have less commercial importance but it is likely that losses would be observed on these hosts should the pathogen become established.

Commercial growers face the additional problem of having few options available to control this disease other than those based upon hygiene/cultural control. Benson *et al*. (2001) stated that control should be based on the elimination of all infected stock plants, which could be costly. Affected plants should be discarded and no cuttings taken from plants with leaf spots (Daughtrey *et al*., 1995). Strict hygiene and manipulation of the glasshouse conditions to lower the humidity would be required. The disease is impossible to control unless plants are produced without overhead irrigation (or rain if grown outdoors) to avoid the spread of infection by water splash (Benson *et al*., 2001). These requirements were included in the statutory action required in the UK outbreaks and resulted in no further findings (S. Matthews-Berry, CSL, *personal communication*). Therefore, preventative measures may reduce the effects of the disease if action is taken early when disease is suspected. The crop break at the end of the season allows for effective hygiene measures and clean-up to be carried-out in the glasshouse. Non-host plants are likely to be grown afterwards (unless the grower is a specialist producer of other Euphorbiaceae). This makes the likelihood of infection carrying over to any following *Euphorbia* crop unlikely. However, there is the possibility that weed species belonging to the Euphorbiaceae may harbour ephiphytic populations or there may be as yet unrecorded natural hosts of this pathogen (Stead, CSL, *personal communication*).

**8. continued.**

Some chemicals have been found to be at least partially effective in controlling the disease in the USA. McFadden & Morey (1962) stated that copper sulphate applied weekly to naturally infected plants of *E. pulcherrima* provided “adequate control”. Miller & Seymour (1973) found that treatments of streptomycin or copper hydroxide with mancozeb both gave excellent control of the pathogen on *E. pulcherrima* in their experiments. Copper hydroxide and fosetyl-aluminium have also been recommended individually for use in controlling this disease (Miller, 1998). However, chemical treatments are thought to rarely be effective in stopping an outbreak once infection has occurred (Benson *et al*., 2001; Chase, 1987).

The use of some of these chemicals would be permitted in the UK. However, the use of antibiotics such as streptomycin has never been permitted, and copper hydroxide is only permitted for use as a disinfectant for plastic containers in the UK. The use of fosetyl-aluminium on poinsettias would be permitted as Aliette ® has an on-label approval for protected pot plants but it recommends that the tolerance of ornamentals is checked before large scale treatments are carried out. While the long-term extension of use arrangement remains in place for non-edible crops (products used under this

arrangement are currently under review and the arrangement will be discontinued in the future), the use of mancozeb would also be permitted but this would be at the grower's own risk. It should be noted that the use of certain chemicals would be considered unacceptable to the horticultural industry due to the spray deposits that would be left on the leaves. However, none of these chemicals mentioned above have been approved specifically for this bacterial pathogen. The other major practical concern for growers would be the risk of phytoxicity associated with chemical treatment. Any damage could affect saleability and cultivars can vary in their sensitivity to chemical treatment.

The use of resistant cultivars to help control the pathogen is not currently an option as none are know to have been bred specifically against this organism and no currently popular cultivars have been tested for susceptibility. After the Florida outbreak in the 1960s many old, popular cultivars of poinsettia were tested and found to be highly susceptible to the pathogen (Benson *et al*., 2001; EPPO, 2006). Some cultivars of *C. variegatum* display low susceptibility to the pathogen but none are known to be completely resistant (Chase, 1985).

**9. What are the prospects for continued exclusion?**

Based on the present knowledge of the pathogen, prospects for continued exclusion are relatively good. The host range of the pathogen is currently reported to be just a few species of the Euphorbiaceae and infection results in leaf spotting symptoms and leaf loss in severe infections. Should imported consignments of infected, symptomatic hosts be inspected on delivery continued exclusion might be achievable. However, the period between infection and disease development is not known and so asymptomatic plants may go undetected at the point of entry. Because the host range of this species has not been investigated recently it is possible that other species of Euphorbiaceae may be hosts and could harbour the pathogen.

Other species of *Xanthomonas* are capable of causing epiphytic (non-symptomatic) infection although this has never been observed with *X. axonopodis* pv. *poinsettiicola*. Should *X. axonopodis* pv. *poinsettiicola* be capable of epiphytic infection then there is the potential for infected but otherwise non-symptomatic plants to evade detection (Daughtrey *et al*., 1995). Further research is needed to confirm if this pathogen is capable of causing epiphytic infection.

Presently for accurate diagnosis to pathovar level, DNA sequencing of the gyrase B region is undertaken. This takes several days longer than other diagnostic methods such as real-time PCR. Quicker and easier methods of diagnosis should be sought if regular testing for the pathogen is required, such as the development of species-specific primers for use in real time PCR.

**10. What are the prospects for eradication?**

The prospects for eradication on known natural hosts are relatively good. The pathogen usually causes visible foliar symptoms, has a limited host range and almost all currently known hosts are grown in protected (nursery) environments in Europe. This allows for effective cultural (non-chemical) eradication measures to be taken. However, there is the possibility that weed species belonging to the Euphorbiaceae may harbour ephiphytic populations or there may be as yet unrecorded natural hosts of this pathogen. *E. heterophylla* is known to be a natural weed host of this pathogen and there may be others.

**11. How would eradication be achieved?**

Eradication (like control) should be based on the elimination of all infected plants and susceptible plants surrounding them, strict hygiene and disinfection. Infected plants would need to be destroyed by burning or deep burial along with any associated debris. Susceptible hosts within the proximity of infected plants may harbour the pathogen because they would be at risk of infection via water splash. Consequently, these plants should also be destroyed. It is suggested that if a high percentage of plants show symptoms (>5%) and the infection is not localised to one part of the stock then the whole stock should be destroyed. The pathogen can be transmitted by contact, therefore the immediate area, along with anything that has been in contact with infected plants, should be washed and disinfected. Eradication of any outbreaks in glasshouses can be aided by creating less favourable conditions for the pathogen. These include the avoidance of overhead irrigation, lowering of the ambient temperature and generally reducing the humidity and any available moisture, particularly on foliage. These measures were undertaken for the recent UK interceptions on *E. pulcherrima* and appeared to prevent further findings of the disease (S. Matthews-Berry & P. Reed, CSL, *personal communication*).

**12. Conclusion and CSL action recommendations.**

Since July 2006, *X. axonopodis* pv. *poinsettiicola* has been intercepted six times in the UK on *E. pulcherrima*. These were the first findings of the pathogen in the UK. The pathogen has previously been reported elsewhere in Europe with outbreaks of the disease in Italy and Germany in 2003 (Stravato *et al*., 2004; Wohanka, 2004).

The pathogen has the potential to establish outdoors in the UK, EU and the EPPO region. The only currently known host that usually grows outdoors is *E. heterophylla*. In Europe, this plant is only reported in Italy where it is a weed in crop fields. Should the pest become established on this host, it is unlikely that it would be considered a problem except as a potential source of inoculum for disease in cultivated host plants. However, there is the possibility that weed species belonging to the Euphorbiaceae may harbour epiphytic populations or there may be as yet unrecorded natural hosts of this pathogen. This therefore means that there may be other sources of inoculum for the poinsettia crop and other cultivated Euphorbiaceae.

The pathogen is likely to establish under protected conditions. Hosts of *X. axonopodis* pv. *poinsettiicola* are usually cultivated under protected environments in the UK, EU and the EPPO region. *E. pulcherrima* is widely grown, whilst *E. milii* and *C. variegatum* are grown to a lesser extent. The outbreaks in Italy and Germany, along with the UK interceptions, show that the pathogen can survive and cause disease in protected conditions in Europe.

Should the pathogen establish, it is likely to cause significant commercial losses amongst affected growers of *E. pulcherrima, E. milii* and *C. variegatum*. The value of poinsettia produced in the UK (£8,597,000 in 2005) indicates that this plant is commercially important. *Euphorbia milii* and *C. variegatum* are of less importance but there are several suppliers of these plants in the UK. Commercial losses are likely to result from the loss of quality due to the leaf spotting and leaf loss caused by the pathogen. No data are available on specific losses due to infection, which means that actual losses are difficult to predict. Commercial losses were observed in a 1960s outbreak in Florida (Benson *et al*., 2001).

**12. continued.**

The severity of infection at some of the UK interception sites meant that some of the affected plants were not of a suitable quality for retail although statutory action resulted in the destruction of these plants. The incidence of infected plants in the UK interceptions ranged from 0.5% to 30%. The extent and severity of any infection would be dependent upon the initial level of the pathogen, and to a large extent, environmental conditions. If conditions are favourable for disease development, resulting losses are likely to be considerable. Options available to the grower for controlling the disease in outbreak situations are limited to implementing strict hygiene measures and the destruction of affected and adjacent susceptible stock as few chemicals are likely to be available long term and none are approved specifically against this disease. As this is a bacterium it is unlikely that fungicides would be considered for approval for control.

Despite the lack of control options, prospects for eradication and continued exclusion are relatively good. The currently known host range and visible foliar symptoms means that infected symptomatic plants are likely to be identified at entry. However, it is possible that asymptomatic plants may be missed depending upon the length of time that symptoms take to develop between export and arrival. This judgment is based on the current knowledge of the pathogen's host range. Whilst, in early studies on the pathogen, a number of hosts have been tested for susceptibility, there are no recent host range data. If the organism is pathogenic to other species of Euphorbiaceae, it would pose a threat to a large number of native wild plants present in the UK, EU and EPPO region. It may also pose a threat to other important ornamental plants thus hindering any eradication campaigns and/or disease management strategies. It may also be epiphytic on other Euphorbiaceae including weed species.

The present geographic distribution of the pathogen is uncertain. Infected poinsettia plants in the UK interceptions in 2006 were associated with countries where the pathogen has not previously been reported. The infected plants can all be traced to the Netherlands, but originally the stock was from Brazil, Zimbabwe or another unknown location or locations. As the stocks from Brazil and Zimbabwe were grown together in the Netherlands, the original source of infection cannot be known. Should the pathogen be endemic in the Netherlands a definite pathway for the pathogen exists for its introduction into the UK and elsewhere in Europe/EPPO region. The likely epidemiology of the pathogen combined with the movement of plants associated with poinsettia production means that the disease can be moved relatively quickly and could become widespread in Europe.

**12. continued.**

Poinsettia production is economically significant in the UK and control options for *X. axonopodis* pv. *poinsettiicola* are limited to cultural measures and the destruction of infected plants. No chemical treatments are specifically approved for this bacterial pathogen. Therefore, consideration should be given to seeking quarantine status for the pathogen. The phytosanitary certificate and plant passporting requirements could be that plants are certified as originating in a country of origin or an area within it or place of production where the pathogen is known not to be present, or the plants are derived from pathogen-tested and pathogen-free stock in a certification scheme. Poinsettia plants are already inspected by the PHSI for England and Wales for a number of pests and diseases on arrival in the UK and inspection at entry would help reduce the chances of the pathogen being introduced. If the pathogen is found to be more widespread in the EU/EPPO region than is currently thought to be the case (which would require

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| surveillance and testing), quarantine listing may be deemed inappropriate and the industry may consider self-regulation, ensuring the eradication of affected stock and strict hygiene measures wherever an outbreak occurs. |
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**Edits and Advice**: Sharon Matthews-Berry, Peter Reed and Neil Giltrap, CSL.
**Location:** CSL Sand Hutton, UK, YO41 1LZ
**Date:** January 17th 2007

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