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DIRECCIÓN GENERAL
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MINISTERIO DE AGRICULTURA, ALIMENTACION Y MEDIO AMBIENTE
Dirección General de Sanidad de la Producción Agraria
Subdirección General de Sanidad e Higiene Vegetal y Forestal

PEST RISK ANALYSIS FOR *Platynota stultana* Walsingham, 1884

Source: University of California

May 2016

Express Pest Risk Analysis for
Platynota stultana Walsingham, 1884

This PRA follows the EPPO Standard PM 5/5(1) Decision support Scheme for an Express Pest Risk Analysis

Summary of the Express Pest Risk Analysis for:

"Platynota stultana"

PRA area: The European Union

Describe the endangered area:

The pest has the potential for establishment **in greenhouses and other protected conditions in all the PRA area**, but with low likelihood as far as current phytosanitary management measures against other Lepidoptera are applied.

Outdoors likelihood of establishment is higher in the Mediterranean basin and Portugal.

Main conclusions

Overall assessment of risk:

Likelihood of:	Rating of risk	Uncertainty	Comments
• **Entry**	**Consignments originating outside the European Union in countries where *P.stultana* occurs (México or the USA)** **High –** For Plants for planting (cuttings, life plants and floriculture products, plants for planting not yet planted) with or without soil attached in consignments originating outside the European Union in countries where *P.stultana* occurs (México or the USA) Worst case: [*Dianthus caryophyllus* L. (carnation)] **High –** For fresh fruits of Grapes (the pest can be carried not only internally in fruit but externally within the bunch) **Medium**: For fresh fruits of kiwis, pomegranates, blackberries / raspberries; and fruits of vegetables: sweet peppers (internal damage) **Low**- For fresh fruits of citrus, pome and stone fruit (external damage) **Low** _ For Cut flowers or branches with foliage in consignments originating outside the European Union (but may be significant for cut flowers repacked in facilities located in the vicinity of production areas, as the pest could reach suitable hosts either from fresh flowers or waste disposal. Worst case: *[Dianthus, Rosa, Chrysanthemum]* **Low**- For packaging material **Consignments originating in the European Union** **Low-** For fresh fruits of peppers **Low-** For natural spread **Very low**- For packaging material	**Medium** **Medium**	**The highest risk for entry is posed by plants for planting of *Dianthus** and fruits of *Vitis vinifera* from the USA or Mexico** *(See point 8)
• **Establishment**	**Outdoors** **High** (Mediterranean Basin and Portugal) **Low** (rest of the PRA area) but **Medium-** for transient populations provided hosts are available **Under protected conditions** **High**	**Low** **Low**	The highest risk of establishment outdoors is posed for the Mediterranean Basin and Portugal. In Almería and Murcia the pest seems to be established at very low population level, not being considered a pest. The probability of establishment under protected conditions will mainly depend on the availability of hosts and the management practices already existing. (See point 10)
• **Spread**	**Low** – Natural spread **Medium** – Human assisted spread **Low** – Estimates and expected spread	**Low** (under current conditions)	Although it was introduced in Spain several years ago, it has not spread during these years.
• **Impact in the current area of distribution**	**High -** North America **Low** - Spain	**Low**	In spite of the time elapsed, the pest does not seem to cause any damage in the regions and crops where it is currently present in Spain.
• **Potential impact in the PRA area**	**High**	**High**	Conditions might change due to future restrictions of active substances or changes in the management because of the introduction of another new pest. In Spain, the impact remains being negligible.

As a consequence, phytosanitary measures are necessary.					
Phytosanitary risk for the *endangered area :*	High	☐	**Moderate**	☑	Low ☐
Level of uncertainty of assessment:	High	☐	**Moderate**	☑	Low ☐

Express Pest Risk Analysis: *Platynota stultana* (Omnivorous Leafroller- OLR) [Lepidoptera: Tortricidae]	
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Stage 1. Initiation

Reason for performing the PRA:

PRA initiated as a consequence of first detections occurred in the provinces of Almería, and Murcia in Spain, within the European Union.

Platynota stultana Walsingham, 1884 is a polyphagous pest as indicated by its common name "omnivorous leafroller" (OLR). It is native to the semiarid area of the northwest of Mexico and the southwest of USA. The pest is only cited in North America, being widespread in California.

The pest was first detected in Europe in February 2009, during routine monitoring carried out by the Health Plant Service of the province of Almería (Andalusia, Spain) on pepper crops (*Capsicum annum*, Solanaceae).

It is not known the origin or pathway of introduction of *P. stultana* into Spain.

P. stultana is not regulated by Council Directive 2000/29/EC. It was formerly considered in the EPPO Alert list.

The recently-adopted EPPO Standard PM 5/5 Decision-Support Scheme for an Express Pest Risk Analysis has been used.

PRA area: the territory of the European Community (EU-28) excluding the overseas territories.

Table 1: Events since 2004 and current situation of OLR in the PRA area. (See **Appendix 1**)

Date/Period	Event
2004	In the UK, a single nursery outbreak in 2004 and *P. stultana* is no longer found in this country (Korycinska & Eyre, 2013)
2009	Within the National Programme for Control of Virus-Vector Insects performed in January 2009, by the Plant Health Service of the province of Almería, the **first detection** of *P. stultana* in a greenhouse of **pepper** (*Capsicum sp.*, Solanaceae) in "El Ejido" municipality was reported. These plants were in an advanced stage of its growing cycle. Afterwards, the presence of OLR was reported in other greenhouses, 3 in Adra, 6 in El Ejido and 1 in La Mojonera (see **Appendix 2).** Chemical treatments against other caterpillars were regularly carried out, and subsequent surveys confirmed that no further detections of *P. stultana* were observed in these greenhouses.
2010	**26/05/2010**: As a result of surveys carried out, the laboratory of Production and Plant Health of the province of Almería, reported the **first detection** of *P. stultana* in **eggplant** crop. Afterwards, it was reported in an eggplant sample provided by a technical expert. No further detections of *P. stultana* were observed in any crop during the year. Captures in pheromone traps were registered in the municipalities of Adra, Berja, El Ejido, La Mojonera and Roquetas de Mar. The traps were installed as part of a programme aimed at establishing lepidopteran flight curves. See **Appendix 3**.

2011	Within the above mentioned programme followed to establish lepidopteran flight curves in Almería during 2011 *P. stultana* was trapped in the municipalities of Adra, Berja, Dalías, El Ejido, La Mojonera, Roquetas de Mar and Vícar. See **Appendix 3**. In these surveys 2 larvae of *P. stultana* were found in a plant of *Atriplex halimus*, a common weed in the province of Almería, right next to a pheromone trap, but no other infested plants were found in the surrounding area. **28/10/2011**: *P. stultana* was detected for the first and only time in green bean by official Plant Health Department inspectors, within the National Programme for Control of Virus-Vector Insects. Technicians from the Territorial Delegation of Agriculture, Fisheries and Environment of Almería [in Spanish: Delegación Territorial de Agricultura, Pesca y Medio Ambiente de Almería] conducted surveys in green beans crops but there were no further detections. In 2011, it was published by (Anonymous, 2011), that *P. stultana* was traped in monitoring traps in 2008 in the province of Murcia, but rather anecdotal, probably due to the control measures applied in the crops. No damage was reported in the following years.
2012	**28/03/2012**: First and only detection of *P. stultana* in **cucumber** crop in El Ejido (**Almería**) occurred due to the inspection of the regional Plant Health Department. No more captures have been reported in such crop. Larvae of *P. stultana* were found in *Ocimum basilicum* inside a greenhouse. This plant is used as refuge for Biological Control Organisms (BCO).
2013	In 2013, it was published the identification of the specimens found in the field work developed in Spain by A.Cox and M.Delnoye during the period 2005-2008 in the Provinces of Almería, Alicante and Granada. These specimens of an unknown Sparganothini species were finally identified as *P. stultana* this year (*Groenen and Baixeras, J.,2013)*
Current situation (see **Appendix 1**)	***In Andalusia:*** (Junta de Andalucía, 2013) **During the 2012-2013 growing season**, more than 600 surveys were carried out in greenhouses of the province of Almería. *P. stultana* **was only found** in one of them. Growers have been warned about the pest and have been encouraged to identify the symptoms in their greenhouses and in case of detection take samples and send them to the regional laboratory. According to the Regional Government of Andalusia, laboratories have not received any enquiries from growers yet. ***In Murcia:*** (Región de Murcia. 2013) Six pheromone traps for *P.stultana* were installed in the municipalities of Águilas (Los Arejos, La Marina de Cope), Mazarrón (Cañada de Gallego), San Javier (El Mirador), Torre Pacheco and Lorca. Monitoring was performed from January to September with traps situated outdoors near tomato crops (Los Arejos, La Marina de Cope, Cañada de Gallego) and pepper crops (El Mirador, Torre Pacheco). The trap located in Lorca was installed in a plot which is surrounded by different crops during the whole year: broccoli, cauliflower, artichoke, watermelon and alfalfa. **A total of 50 adults have been captured in the six traps during 8 months. No captures have taken place in the trap located in Lorca. See Appendix 4.** Surveys in susceptible crops have been carried out every two weeks during the growing cycle both outdoors and/or under protected conditions: pepper, tomato, broccoli, cauliflower, artichoke, watermelon and alfalfa. No damage has been found. No samples taken by growers have been received by the Laboratories. Since 2013 no new enquiries have been received from growers The situation remains the same.

Stage 2. Pest risk assessment

1. Taxonomy:

Domain: Eukaryota; Kingdom: Animalia; Phylum: Arthropoda; Subphylum: Hexapoda; Class: Insecta; Order: Lepidoptera; Family: Tortricidae; Genus: Platynota; Species: ***Platynota stultana*** (Source: EPPO-PQR)

Other Scientific Names

Platynota chiquitana Barnes & Busck; *Sparganothis chiquitana; Sparganothis stultana*

Common names:

Omnivorous leaf roller **(OLR)**, leafroller, omnivorus (English); Rizadora (Spanish)

2. Pest overview

This quarantine pest has been known in America about for more than 100 years. Therefore there is abundant literature about it and its review shows that its behaviour has varied over the years. That may be a sign that *P. stultana* has high adaptability to persist and multiply in different crops.

Literature shows that the pest was described in 1884 from Sonora, Mexico, and its native range probably included adjacent parts of the southwestern U.S., as it was collected in Cochise County, Arizona in the 1890s by F.H. Snow. It was reared in Los Angeles County from tomato in 1898. It became a pest of citrus in cismontane southern California by 1913. (Powell, 1980). In 1942 it had a broad range of hosts, but in California it was responsible for damage chiefly to carnation, rose and oranges. (Bohart, 1942).

In 1954 it infested cotton and lucerne fields in Imperial County, California. In approximately 1960 this species apparently underwent a change in physiological tolerance and during the following several years greatly expanded its geographic and ecological range in California. (Powell, 1980).

Currently, *P.stultana* is more common in interior valleys and southern California mountain orchards, especially those next to vineyards, than in orchards in coastal areas or at higher elevations of the Sierra Foothills.

Omnivorous leafroller is quiescent (not diapausing) during the colder winter months. That's why **it seems unable to survive prolonged periods of freezing** (UC-IPM, 2014).

P. stultana - Basic Information

Life stages

Stage	*Colour/shape*	*Size*
Eggs	Transparent to greenish/elliptical and crushed. Egg masses. Oval.	0.5x0.3 mm
Larvae (5 instars)	Early stages: Cream body and brownish-black head and shield. Mature larvae: Cream to brown-grey with light-to-dark brown head and shield They have whitish, slightly convex and oval tubercles (pinaculae) at the base of the body hairs on the upper side of the abdominal segments.	13-18 mm
Pupae	Cream to dark brown	12-15 mm
Adults	Protruding snout-like mouthparts. Bell-shaped. Dark brown on the basal half and golden brown on the distal half. In the female the markings are less distinct. V-shaped dark mark in the middle	♂: The wingspan is 10-15 mm ♀: The wingspan is 14-19 mm

Sources: (CABI, 2014); (Varela et.al, 2010); (Groenen & Baixeras, 2013)

Data referred to "Temperature and relative humidity thresholds and preferences" is shown in **Appendix 5**.

Life cycle

The average female lives for 10.5 days. She mates and begins laying eggs on the third day after emergence and deposits over 300 eggs over a period of 6.5 days.

According to (Varela et.al, 2010), in vineyards in California, due to the **absence of diapause**, all developmental stages can be found during the year making it difficult to separate the generations. Pheromone traps indicated that OLR has 3 generations in the coastal areas, and 4 (and sometimes a partial 5th) in warmer inland valleys. Nevertheless, (Hasey et al, 2000) described that OLR has 4-6 generations per year in California, USA, depending on climatic conditions.

Larvae in the 3rd, 4th and 5th instars overwinter in webbed nests (AliNiazee & Stafford, 1972)

In Almeria (Spain), capture records showed two peaks in March and September, with a high peak in July. This indicates that there are probably 3 generations per year in this area.(Junta de Andalucía, 2013)

Eggs are usually deposited between sunset and sunrise (Atkins et al., 1957) with an average of 97 eggs per egg mass in the field. Usually all eggs laid by a female in one night are deposited in one group, but sometimes two or more smaller batches are formed after having been deposited about a half of the total number of eggs.

The larva constructs a network of silken filaments ('ladder') on the surface of the host plant, used to provide traction for the leg hooks as the larva moves about. A newly hatched larva is negatively geotrophic, and moves towards the top of the plant or to the end of a branch or leaf. From this position it may find a leaf or flower bud in which to conceal it and immediately start feeding, or it may travel about on the plant. Frequently, a newly hatched larva will drop from its high perch on a plant on a silk strand and move onto a lower leaf, or it may be blown by the wind to another plant. Young larvae feed on the undersides of leaves at the vein juncture, or between two touching leaves, or in a leaf or flower bud, or under the bract of a cotton square or boll. After they have reached the second or sometimes even third instar, they feed while concealed in rolled or folded leaves (Atkins et al., 1957). The larva undergoes five instars. (Female larvae may also undergo six instars according to (Zenner-

	Polania, 1974). Adults are most active during the night although they are able to fly without being bothered during the day.

Host plants	As its name "omnivorous leafroller" indicates, *P. stultana* has a **broad range of recorded hosts**. Its potential range of food plants includes more than 20 plant families including relevant ornamental plants, agricultural crops, and even forest species (Powell & Brown, 2012) cited by (Groenen & Baixeras, 2013). Each host of *P.stultana* that has been found in any reference or database is listed in **Appendix 6**. The following hosts (*Caesalpinia pulcherrima* (L.) Sw., *Cercidium* sp., *Delonix regia* (Bojer ex Hook.) Raf. , *Leucaena leucocephala* (Lam.) de Wit, *Mimosa asperata* L.) have not been included in this list, because considering Brown et al, 2008, they have been artificially inoculated (feeding niche: specificity test). PRA assessors have shortlisted several **'preferred host' taking into account** those that fulfil at least **one of the following criteria**: – Having *Platynota stultana* specifically included as pest in the Integrated Pest Management Guidelines for its cultivation; – Being cited in literature as 'preferred', 'main' or 'primary' hosts of *Platynota stultana*; – Being cited by authoritative sources as crops where *Platynota stultana* has caused losses, or where damage by *Platynota stultana* has been quantified or specifically described. According to these criteria, the following hosts have been shortlisted since they have an Specific Pest Management Guidelines in California: ***Actinidia deliciosa*** (kiwifruit), ***Capsicum annuum*** (bell pepper), ***Citrus, Gossypium*** (cotton), ***Malus domestica*** (apple), ***Prunus domestica*** (plum), ***Prunus persica*** (peach), ***Pyrus*** (pears), ***Rubus*** (blackberry, raspberry) and ***Vitis vinifera*** (grapevine). Additionally, (CABI, 2014) and other references describe as main, preferred or primary hosts the following: ***Dianthus caryophyllus*** (carnation), ***Medicago sativa*** L. (alfalfa), ***Punica granatum*** (pomegranate), ***Rosa*** (rose) and ***Zea mays*** L. (maize). All of these hosts have also been cited by authoritative sources as crops where *P.stultana* has caused losses, or where damage has been quantified or described. Nevertheless: • *Medicago sativa* (alfalfa) is 'main' host in CABI, but the only description of damage cited was reported in 1957**. No subsequent reports of damage have been found.** Thus it is not further considered `preferred host` in this PRA. • *Zea mays* (maize) is 'main' host in CABI, but the only description of damage cited was reported in 1983**.** (Brown et al., 2008) citing (Powell, 1983) **No subsequent reports of damage has been found.** Thus it is not further considered `preferred host' in this PRA. Note that, in Spain, damage by *P.stultana* has exclusively been reported on *Capsicum annuum* L. (pepper). Nevertheless, there are anecdotal reports of ORL attacks on *Phaseolus vulgaris* L. (common bean), (October 28, 2011); *Solanum melongena* L. (aubergine), (May 26, 2010); *Cucumis sativus* L. (cucumber), (March 28, 2012); *Ocimum basilicum* L. (basil), used in greenhouses as reservoir for natural enemies (March 28, 2012); and *Atriplex halimus* L. (salado) indigenous flora, (May 12, 2011). *P.stultana* has not been detected again on these species and no further damage has been reported. Thus, they are not considered `preferred host' in this PRA. From the foregoing, it can probably be concluded that ***P. stultana*** **can try to colonize different host plants if preferred hosts are not present.** *P. stultana*, as a highly polyphagous pest, is likely to reach and select its hosts by trial and error. Test bites may be used by insects to taste the plant tissue, unless continuous feeding occurs, these do not confirm host recognition and acceptance. **Thus, the presence of *P. stultana* on a particular plant species can not be considered as a proof of host suitability**. This might well be the case for some of these plants, as *P. stultana* has not been recorded elsewhere, aubergine, basil or *Atriplex* L.

Symptoms	***P. stultana* is a pest that usually feeds on leaves.** Symptoms in preferred hosts are described below: • On *Actinidia deliciosa* (***kiwifruit)***, Omnivorous leafroller directly damage fruit by scarring the surface when they feed (UC-IPM, 2014) Discordant information is shown in CABI about injury of *P. stultana* in kiwi. In CABI description of *P. stultana* there is a cross-reference that literally says: *"On kiwi fruit …larvae may also tunnel into mature fruit* (Hasey et al., 2000)*"*. But when the cited reference *"*(Hasey et al., 2000)*"* is accessed, this information cannot be found. • On *Capsicum annuum* (***pepper)***, (UC-IPM, 2014) larvae build a nest by tying leaves together with silk webbing and remain inside this nest while feeding on the surface of the leaves. When leaves lie over a fruit, or if two fruits are touching, the larva will nest between the surfaces and feed on the fruit, causing substantial scarring. Larvae do not burrow into the fruit. **Nevertheless, anecdotal damage in fruits has been found. It consists of a small single gallery from the stalk area to the inside of the fruit** making galleries between the seeds. A single gallery is fortunately unusual since Tortricidae lay eggs in masses on leaves. (Junta de Andalucía, 2013). • On ***citrus***, in spring small larvae spin webs and feed on new foliage. Later in the season they tie leaves to fruits and feed under the buttons, leaving ring scarring similar to that of citrus thrips. In summer and fall, they tie leaves to ripening fruit and feed on the rind. When mature they pupate inside the rolled leaves within a cocoon. Adult female moths lay overlapping eggs in clusters that resemble fish scales on the upper surface of leaves and on fruit (UC-IPM, 2014). • On *Gossypium* (***cotton)***, it webs leaves or bracts together with silk and form a shelter in which they feed. Injury caused is sporadic, localized and seldom of economic importance. Larvae feed on leaves, small squares and on the surface of green bolls; injured bolls may open prematurely. (UC-IPM, 2014); (CABI, 2014). • On *Malus domestica* (***apple)*** and *Pyrus* (***pears)***, it feeds on leaves and on the surface of fruit, sometimes webbing one or more leaves to the fruit protection. They chew shallow holes or grooves in the fruit surface, often near the stem end. Damage is similar to that caused by orange tortrix. Larvae feed where fruit are touching, so entire clusters can be damaged. (CABI, 2014). On pears, infestations are often spotty, making monitoring difficult (CABI, 2014). • On *Prunus persica* (***peach)*** and *Prunus domestica* ***(plum)***, larvae often web leaves into rolled protective shelters while feeding. They feed on leaves and on the surface of fruit, sometimes webbing one or more leaves to the fruit for protection. They chew shallow holes or grooves in the fruit surface, often near the stem end, and webbing is usually present on fruit. Damage results from fruit feeding. Young fruit may be destroyed, and scars on older fruit will cause them to be culled or downgraded at harvest. Feeding injury also may increase the incidence of brown rot and other fruit decays. (UC-IPM, 2014) • On *Rubus* (***blackberry*** and ***raspberry)***, larvae feed on fruit and foliage. Foliar injury is generally minor; the primary problem caused by leafrollers is that they get into and contaminate fruit. (UC-IPM, 2014) • On *Vitis vinifera* (***grapes)***, it overwinters in the larval stage in grape mummies, vineyard weeds, and other trash in the vineyard. In spring, larvae complete their development and moths emerge and lay shinglelike egg masses on grape leaves. After about 5 days these eggs hatch, and larvae web two young leaves together to form a nest in which they feed. It does not roll leaves as well as does the grape leaffolder; instead, it ties leaves together and feeds inside. Later, nests can be found in flower clusters and bunches, as well as on leaves and in shoot tips. (UC-IPM, 2014) Although it does feed on leaves, flowers and developing berries, the primary problem is that it allows rot organisms to enter fruit at the sites where it feeds (CABI, 2014) • On *Punica granatum* (***pomegranate)***, the caterpillars typically carve surface grooves where two fruit touch, or where the caterpillar has tied a leaf to the fruit surface. Sometimes the caterpillar will tunnel into the fruit. If skin penetration has occurred, even small openings, pathogens become established internally and grow in the arils. If the fruit is not culled before juicing, the product may be ruined. (Carroll, 2013). • On *Dianthus caryophyllus* (c***arnation)***, damage is of 3 types, leaf-tying, bud boring and stem boring in descending order of frequency (Bohart, 1942) • On *Rosa* (***rose)***, larvae draw two leaves together, or fold over the edges of individual leaves, usually severing the petioles of the leaflet and causing it to die. Some feeding takes place on the inner side of the folded leaf; also flower buds are sometimes eaten into on the side and tender growths are cut off. (United States: Bureau of Ent.,1933)

Detection and identification	Detection in field can be made with pheromone traps. Pheromone lure is specific for the species and is commercially available. Adults are very distinct and readily identifiable. However, in the field, adults tend to hide during the day and are seldom seen. Males caught in pheromone traps are the most common way to encounter adults. These are bell-shaped and readily distinguishable by its protruding snout-like mouthparts. As in most members of the tribe Sparganothini, the labial palpi are long and frontally projected. This character is not found in the European fauna except in the few species of the genus Sparganothis Hübner, reducing potential mistakes in identification. Male and female genitalia include unmistakable features (Groenen & Baixeras, 2013)**.** Mature larvae of OLR have whitish, slightly convex and oval tubercles (pinaculae) at the base of the body hairs on the upper side of the abdominal segments. Morphologically similar larvae either lack or have rounded pinaculae. (Varela et al., 2010). According to (CABI, 2014) "pest or symptoms are usually visible to the naked eye", when it is carried in trade as larvae (in flowers, inflorescences, cones, calyx, fruits (inc.pods), and leaves) , and as eggs or pupae (in leaves). Monitoring methods are described by the University of California Pest Management Guidelines in some preferred hosts: • On *Actinidia deliciosa* (***kiwifruit***), there is not enough research in kiwifruit regarding monitoring, therefore it is recommended to refer to the monitoring information used in grapes, that is closely examine blossoms and vegetative shoots in the vineyard during prebloom and bloom for the presence of caterpillars, webbed leaves, or feeding damage

- On *Capsicum annuum* (***pepper***), regular field monitoring will help to detect potential problems with this pest through periodic inspection of plants during the growing season in several areas of the field for signs of leaves webbed together. Weed control and site location play an important role in preventing infestations of omnivorous leafroller. Pay particular attention to weedy areas or locations near other susceptible crops. If nearby alfalfa or sugarbeet fields have been harvested, increase the intensity of the inspection.
- On ***citrus***, it appears that omnivorous leafroller is present in the grove, monitor in the south and east quadrants of trees. In spring, look for small larvae under sepals when monitoring for citrus thrips. During summer, less frequent monitoring may be sufficient but check to see if parasites are effective.
- On *Gossypium* (***cotton***), infestations are usually reduced by natural enemies. In Arizona, the suggested treatment threshold is when 25% of the plants have an active larva; California has not established a threshold.
- On *Malus domestica* (***apple)***, omnivorous leafrollers commonly develop on host plants outside the orchard and move into the orchard in early summer. Infestations often are spotty, making monitoring difficult. Throughout the season, watch for leafrollers when monitoring other pests. Begin monitoring by placing pheromone monitoring traps in the orchard by mid-February in the San Joaquin Valley to establish the biofix for the first flight. Biofix is the first night that moths are consistently caught in traps over the period of several nights. First generation omnivorous leafrollers are most likely to appear on weeds or cover crop.
- Omnivorous leafrollers is a minor pest of *Pyrus* (**pears**), and commonly develop on host plants outside the orchard and may move into the orchard in early summer. Infestations often are spotty, making monitoring difficult if more than one omnivorous leafroller is found when sampling during the cluster stage, consider treating. If only one larva is found, look for this pest again in a week when monitoring for other caterpillars.
- On *Prunus persica* (***peach***) and *Prunus domestica* (***plum)***, omnivorous leafrollers can be found in orchards in the spring (early summer in plum trees), but the majority of damage occurs during the summer. It is important to monitor regularly each season so that prompt action can be taken if damaging populations develop. Monitoring begins by placing pheromone monitoring traps in spring to establish the biofix for the first flight, watch for the presence of leafroller larvae while monitoring, and monitor the fruit closely for signs of damage, examine fruit on trees every other week after colour to detect any developing problems in the orchard.
- On *Punica granatum* (***pomegranate)***, it is recommended to monitor omnivorous leafroller adults with a minimum of 2 traps per block first placed in orchards at 5 to 6 feet high in the canopy around February 15 to 20. For blocks over 20 acres (aprox.8 ha) use an additional 1 trap per 20 acres. Check the traps at least one to two times per week until the first consistent moth catch (the biofix date).
- On *Rubus* (***blackberry*** and ***raspberry)***, begin monitoring for the leafrollers in early spring by examining plants for larvae. Larvae may web leaf surfaces together, especially those of newly extending laterals, and live between them. Or they may roll leaves and live in the folds. One way to evaluate infestation level in early spring is to carefully inspect newly extending laterals for webbing, frass, leaf damage, and the presence of larvae. Another good way to look for leafrollers is to agitate the hedgerow, either by beating or shaking the plants, and collect the fallen material into a bucket or wide, flat container. Carefully sift through this material to detect larvae (early larval instars can be quite small). Concentrate monitoring activities in suspected or previously infested areas.

  Pheromone traps placed in caneberry (***blackberry*** and ***raspberry)*** plantations can be good indicators of moth flight activity and may help to pinpoint when the most intensive monitoring for larvae should be done. Concentrate examinations of the plants in those periods after flight peaks when larvae are increasing in number.
- On *Vitis vinifera* (**grapes**), it is recommended to place pheromone traps in the vineyard just before budbreak, and to check traps twice a week. Information obtained from trap catches is used to establish a biofix, which is an identifiable point in the life cycle of this pest. For omnivorous leafroller, the biofix is the first night in which moths are consistently caught in traps. Continue to monitor with pheromone traps through fruit set, until berries are pea-sized, to track adult flights of subsequent generations

Season	Directions	On each vine
Early in rapid shoot growth	Start to monitor 20 vines weekly by looking at 5 vines in each quadrant of the vineyard	• Monitor for webbed leaves. • If you see webbing and frass, look for caterpillars. • Map out areas of concern for bloom monitoring.
Bloom and after	Continue monitoring	• Examine 10 flower/fruit clusters in the center of each of the 20 vines, for a total of 200 clusters. • Record the number of infested clusters.

- On ***Floriculture*** and ***Ornamental Nurseries*** it is important regular monitoring each season so that prompt action can be taken if damaging populations develop and throughout the year, watch for the presence of leafrollers while monitoring for other pests.

  Inspection of plants during the winter period for egg masses is recommended. Egg masses are about the size of a thumbprint and laid on smooth wood. Also check blooms and leaves for the presence of the leafroller and other larvae. To monitor caterpillars, search the outer canopy. Begin checking once a week starting from the spring leaf flush. Closely examine blossoms and vegetative shoots in the nursery in the spring for the presence of caterpillars, webbed or rolled leaves, or feeding damage.

3. Is the pest a vector? **Yes** ☐ **No** ☒

4. Is a vector needed for pest entry or spread? **Yes** ☐ **No** ☒

5. Regulatory status of the pest

- *P. stultana* is not currently included in the EPPO Lists, but it was in the **EPPO** Alert List from 1998 to 2002:
  - In 1998, as a consequence of the publication of the book "Insect and related pests of flowers and foliage plants. Some important, common and potential pests in the southeaster United States".by the North Carolina Cooperative Extension Service (Baker, 1994), the EPPO Secretariat listed *P. stultana* as a pest of potential quarantine interest RS-98/180 (EPPO, 1998). Thus, it was included in the "Alert List" (Rse 99/134).
  - It was deleted from the EPPO "Alert List" in 2002.

  Currently, information in the Pest Quarantine Retrieval Database (EPPO, 2015) is not updated (e.g: it shows that maize is the only host associated to the pest).
- *P. stultana* is in the "A1 list" in **COSAVE** (Argentina, Bolivia, Brazil, Chile, Paraguay, Peru, Uruguay).
- It is also a quarantine pest in **Japan** (*http://www.pps.go.jp/english/law/list1-(20130125-).html)* and a pest of quarantine significance in some countries such as **New Zealand or Australia**, where it is regulated for some plant products (table grapes, peaches, nectarines) originating from California or Mexico.
- There are also import requirements in Mexico for stone fruits from the USA (methyl bromide treatment). (SAGARPA-SENASICA, 2009).

6. Distribution

Continent	Distribution	Provide comments on the pest status in the different countries where it occurs	Reference
Africa	-----	------	-----
America	***Mexico***	Present, no details Restricted distribution	(CABI, 2015) (SAGARPA-SENASICA, 2011b.)
	⇒ Sonora	Present, no further details Detected in *Citrus paradisi* in Sonora State	(Fu Castillo et al., 2011) (SAGARPA-SENASICA, 2011b.)
	⇒ San Luis Potosí	Collected in several places on 10 November 2006 in *Parkinsonia aculeata*	(Brown et al., 2011)
America	***United States of America***	Present, restricted distribution	(CABI, 2015)
	⇨ Arizona	Present, no further details	(UC-IPM, 2014); (Gilligan & Epstein, 2012); (Kerns et al.2004); (NVWA, 2012); (Zenner-Polania, 1974); (Atkins et al., 1957)
	⇨ Arkansas [(1)]	Present, no further details	(CABI, 2015)
	⇨ California	Widely distributed	(UC-IPM, 2014); (Gilligan & Epstein, 2012); (Day & Wilkins, 2009); (Kerns et al.2004); (Powell, 1980); (NWVA, 2012); (Zenner-Polania, 1974); (AliNiazee & Stafford, 1972); (Atkins et al., 1957)
	⇨ Florida	Present, no further details	(Gilligan & Epstein, 2012);
	⇨ Hawaii	Restricted distribution	(Gilligan & Epstein, 2012); (Miller et al., 1995)
	⇨ Illinois[(1) (3)]	Greenhouse roses	(CABI, 2015) (Zenner-Polania, 1974)
	⇨ Maryland [(1)]	Present, no further details	(CABI, 2015)
	⇨ Massachusetts [(1) (3)]	Greenhouse roses	(CABI, 2015) (Zenner-Polania, 1974)
	⇨ Michigan [(1) (3)]	Greenhouse roses	(CABI, 2015) (Zenner-Polania, 1974)
	⇨ New Mexico	Present, no further details	(NVWA, 2012)
	⇨ New York [(3)]	Greenhouse roses	(Zenner-Polania, 1974)
	⇨ Pennsylvania [(1) (3)]	Greenhouse roses	(CABI, 2015); (Zenner-Polania, 1974)
	⇨ Texas	Present, no further details	(Gilligan & Epstein, 2012); (CABI, 2015)
Asia	-----	------	-----

Continent	Distribution	Provide comments on the pest status in the different countries where it occurs	Reference
Europe	***Spain***	Restricted distribution, few occurrences	MAGRAMA, 2013
	⇨ Andalusia (Almeria; in *7 municipalities (Adra, Berja, Dahlias, El Ejido, La Mojonera, Roquetas de Mar and Vicar))*	⇨ Outbreaks in greenhouses	⇨ (Junta de Andalucía, 2013)
	⇨ Murcia	⇨ Only captures	⇨ (Región de Murcia, 2013))
	⇨ Alicante	⇨ Only captures	⇨ (Groenen & Baixeras, 2013) [4]
	⇨ Andalusia (Granada)	⇨ Only captures	⇨ (Groenen & Baixeras, 2013) [4]

[1] *Records from these locations in the eastern United States are questionable* (Gilligan & Epstein, 2012).
[2] *In 1936 it was reported attacking to greenhouse roses in* ***Virginia*** (Nelson, 1936)***.***
[3] *Only under protected conditions.* (Zenner-Polania, 1974)
[4] *Field work developed in Spain in the period 2005 – 2008 in the provinces of Almeria, Alicante, and Granada by A. Cox and M. Delnoye rendered a good series of specimens of an unknown Sparganothini species that was finally identified by A. Schreurs and the first author of this paper as belonging to P. stultana.*

Comments on the distribution	There have been found references concerning their existence in Sonora (México) and the USA (Arizona, California, Florida, Hawaii, New Mexico, Texas). In spite of what is registered in the Crop Protection Compendium (CABI, 214), and the Pest Quarantine Retrieval (EPPO, 2014) about the presence of OLR in Mexico "Present, no details", the assessors only have retrieved the presence of the pest in: Sonora, and San Luis Potosí. This information is consistent (but San Luis Potosi), with the information published by SAGARPA-SENASICA, 2011a. In 1936 it was reported attacking roses in greenhouses in Virginia; the observations were made at a temperature of 70-75°F., and a relative humidity of 70-80 per cent (Nelson, 1936) but until now it has not been found any other report of outbreak in Virginia. It has been reported attacking roses in California, Arizona (Atkins et al. 1957), Pennsylvania, Virginia (Smith et al. 1965), New York (Ota 1969), Massachusetts (Bourne 1936), Il1inois (Compton 1941) and Michigan (Wildon 1946). In the northern part of the Eastern United States the OLR has never been reported by the authors cited above as attacking outdoors roses (Zenner-Polania, 1974) *Platynota stultana*, commonly referred to as the "omnivorous leafroller" in the American economic entomology literature, has been inadvertently introduced into many locations throughout the U.S.A., but apparently is unable to survive the winter in colder climates (Brown, 2013). According to the information provided *Platynota stultana* has been occasionally reported in greenhouses in the coldest parts of the United States. However, it is only established outdoors in areas with warmer winters, such as California and Arizona. In Europe this lepidoptera has only been detected in some places of Spain. In the province of Almeria, there have been detections in 7 municipalities (Adra, Berja, Dahlias, El Ejido, La Mojonera, Roquetas de Mar and Vicar) mainly on pepper. In the remaining districts (Alto Almanzora, Costa Levante, Rio Andarax-Birth, Under-field Andararax Taverns, Hoyas-Plateau) the presence of the pest has not been detected. As far as it is known, in the US and Mexico, *P. stultana* is located in areas with warm winters. In Europe, *P. stultana* has been detected in areas with sufficient warmth to withstand the winter. (See **Appendix 8**)

7. Host plants /habitats* and their distribution in the PRA area

In **Appendix 9** the presence of all *Platynota stultana* hosts and its distribution in the UE have been described. Those hosts considered as `**preferred hosts**´ (always preferring leaves) for *P. stultana* (see question 2) have been highlighted in orange.

Preferred hosts [worst case scenario] according to the above explained are:

Actinidia deliciosa *(*kiwifruit), ***Capsicum annuum*** L. (bell pepper), ***Citrus*** L.**,** ***Dianthus caryophyllus*** (carnation), ***Gossypium*** (cotton), ***Malus domestica***. (apple), ***Prunus domestica*** *(plum),* ***Prunus persica*** (peach), ***Punica granatum*** (pomegranate), ***Pyrus*** (pears), ***Rosa*** (roses), ***Rubus*** (blackberry, raspberry) and ***Vitis vinifera*** (grapevine).

8. Pathways for entry or spread of *P.stultana*

Considerations for defining and rating the pathways:

According to (CABI, 2014) *P. stultana* can be carried in trade as larvae in flowers, inflorescences, cones, calyx, fruits (inc.pods), and leaves, and as eggs or pupae in leaves.

All preferred hosts of *P. stultana* are present in European Union, however, the prevalence and association with the commodities is different in the USA and Mexico from Spain. Consequently, the following pathways were studied separately according to the origin: (1) plants for planting; (2) Fruits of fruit trees; and vegetables (fruits, stems, leaves or flower plant parts for fresh consumption); (3) Cut flowers or branches with foliage; (4) Packaging material; (5) Natural spread; (6) Travelers carrying fruits or plants for planting of hosts; (7) Soil or growing media; (8) Movement of individuals, e.g. traded by collectors; (9) Processed commodities made from fruit of the hosts (e.g. dried fruit, pulp, canned preparations, etc.)

It has also been taken into account the categorization of hosts provided in **Appendix 7**: (1) Fruit trees; (2) Floriculture crops & Ornamental trees; or (3) Vegetable crops.

Pathways analysed will consider the worst case: "**Preferred**" hosts. Nevertheless, since all the hosts have been taken into account, comments on pathways of secondary hosts can be found in Appendix 11.

Each considered pathway is provided below in the following tables: "Table 6: Pathways studied in detail in order of importance"; "Table 7: Pathways less likely and then not retained"; "Table 8: Pathways not considered relevant* for *P.stultana"*.

Table 6: Pathways studied in detail in order of importance

Pathways studied in detail	**Short description explaining why it is considered as a pathway** *Is it prohibited / regulated in the PRA area?*
PI: **Plants for planting of "preferred" hosts (except seeds, bulbs and tubers) with or without soil attached** **in consignments originating outside the European Union**	**Plants of fruit trees intended for planting** (except seeds, bulbs and tubers) **of 'preferred' hosts, with or without soil**, other than dormant plants free from leaves, flowers and fruit, **originating in countries where *Platynota stultana* is known to occur**, can be considered the main pathway of entry for the pest. *"It seems probable that P. stultana was introduced in Santa Cruz Island in the early 1970s, possibly via cut flowers or potted nursery plants, and it is established on the island."* (Powell, 1980). **Association to the pathway at origin:** *P. stultana* is a pest that usually feeds on leaves. In addition, it is widespread in California and Mexico, and the association to this pathway at origin is high. **a) Prohibited in the PRA area by Council Directive 2000/29/EC** In accordance with **Council Directive 2000/29/EC, Annex III Part A** 'Plants, plant products and other objects the introduction of which shall be prohibited in all Member States': **Category 1. Fruit trees** Plants of ***Malus*** Mill., ***Prunus*** L., ***Pyrus*** L., intended for planting, other than dormant plants free from leaves, flowers and fruit, originating in non-European countries, are prohibited by Annex III A (9). Plants of ***Malus*** Mill., ***Prunus*** L., ***Pyrus*** L and their hybrids, intended for planting (other than seeds), are prohibited from non-European countries, other than Mediterranean countries, Australia, New Zeland, Canada, and the continental states of the USA by Annex III A (18). Plants of ***Vitis*** L., other than fruits, originating in third countries other than Switzerland, are prohibited by Annex III A (15). Plants of ***Citrus*** L., other than fruit and seeds, originating in third countries, are prohibited by Annex III A (16). Plants and pollen of ***Malus*** Mill and ***Pyrus*** L. other than fruit and seeds, originating in third countries other than Switzerland and other than those recognised as being free from Erwinia amylovora (Burr.) or in which pest free areas have been established in relation to Erwinia amylovora (Burr.) Winsl. et al., to some protected zones.(Council Directive 2000/29/EC, Annex III Part B (1)) **Category 2. Floriculture & Ornamental trees** Plants of ***Rosa*** L., intended for planting, other than dormant plants free from leaves, flowers and fruit, originating in non-European countries, are prohibited by Annex III A (9). **Category 3. Vegetables** **Plants of Solanaceae** intended for planting, other than seeds, originating in third countries, other than European and Mediterranean countries, are prohibited by Annex III A (13). Nevertheless **plants of vegetable crops (Category 3), when intended for planting, are typically traded in form of seeds**. This is particularly true for long-distance trade, as it is the case between North America and the European Union. Detailed trade data between U.S.A, Mexico and Spain was checked using the CEXVEG database (CEXVEG, 2013) in order to verify that no seedlings of vegetable crops have been imported from these countries in the last years (see table in Annex 11. "Comments on pathways").

b) Pre-existing general measures outlined in Council Directive 2000/29/EC for plants for planting of 'preferred' hosts.

Council Directive 2000/29/EC Annex IV A I lays down general requirements relating to plants for planting (36.1); plants of herbaceous species intended for planting (points 32.1, 32.3); trees and shrubs, either deciduous (point 40) or not (point 39); annual/biennial plants (point 41) and some herbaceous perennials (point 44), intended for planting, originating in third countries, as well as plants of herbaceous species originating in non-European countries (45.1) and plants intended for planting where relevant harmful organisms are known to occur (46). (See Appendix 11"Comments on pathways")

CONCLUSIONS ABOUT GENERAL MEASURES:

Preferred host not directly prohibited by annex III:

- Dormant plants free from leaves, flowers and fruit, of ***Malus*** Mill., ***Prunus*** L., ***Pyrus*** L., intended for planting, originating in Mediterranean countries, Australia, New Zeland, Canada, and the continental states of the USA.

- Plants of ***Actinidia deliciosa*** (kiwi), ***Punica granatum*** (pomegranate), ***Rubus*** L. (blackberry, raspberry)

- Plants of ***Dianthus caryophyllus***

Preferred host not directly prohibited by annex III but with measures in annex IV that might prevent from the entry of P. stultana

- As a consequence of Annex IV A I (39) and (40), the following preferred hosts from México or the USA intended for planting shall be dormant and free from leaves, flowers and fruits have been grown in nurseries and are free from signs or symptoms of harmful organisms, to be allowed entry into the European Union: ***Actinidia deliciosa*** (kiwifruit); ***Punica granatum*** (pomegranate); ***Rubus*** (blackberry and raspberry).

Preferred host without measures that might prevent from the entry of P. stultana

- As a result of the prohibitions and the provisions laid down by Council Directive Annex III and Annex IV, respectively, the only "preferred" host of *P. stultana* that is allowed to entry into the EU from Mexico or the USA with remaining leaves, fruits or flowers not applying at least the measure "free from signs or symptoms of harmful insects", is ***Dianthus caryophyllus*** L. (carnation).

Specific regulation for ***Dianthus caryophyllus*** L. (carnation):

Dianthus L. intended for planting are commonly traded to Europe as seeds, but also as cuttings, which do pose risk of pest entry.

•Parts of plants, other than fruit and seeds of Dianthus L., originating in third countries, shall be subject to a plant health inspection in the country of origin or the consignor country before being permitted to enter the Community [Annex V B I (2)].

•Council Directive 2000/29/EC lays down several special requirements for plants of *Dianthus* L., intended for planting, other than seeds, to prevent entry and spread of *Helicoverpa armigera* (Hübner), *Spodoptera littoralis* (Boisd.) [Annex IV A I (27.1)], *Spodoptera eridiana* Cramer, *Spodoptera frugiperda* Smith, *Spodoptera litura* (Fabricius) [Annex IV A I (27.2)], Erwinia chrysanthemi pv. dianthicola (Hellmers) Dickey, Pseudomonas caryophylli (Burkholder) Starr and Burkholder and *Phialophora cinerescens* (Wollenw.) Van Beyma [Annex IV A I (29)].

As a result of the prohibitions and the provisions laid down by Council Directive Annex III and Annex IV, respectively, the only "**preferred**" host of *P. stultana* that is allowed to entry into the EU from Mexico or the USA with remaining leaves, fruits or flowers not applying at least the measure *"free from signs or symptoms of harmful insects"*, **is *Dianthus caryophyllus*** L. (carnation).

Secondary hosts have a lower risk: *Chrysanthemum* L. [=Dendranthema (DC.)Des Moul], *Convolvulus* L. (bindweed), [Convolvulaceae], *Cyclamen* L. (cyclamen) [Primulaceae], *Malva* L. (mallow), [Malvaceae], *Pelargonium* L'Hér.ex Aiton (geranium) [Geraniaceae] (see Appendix 11)

Trade of plants for planting of these species are usually traded as **cuttings**.

A detailed analysis of the specific regulation of these pathways and its associated risk is shown in Appendix 11.

PII:

Fruits of fruit trees; and vegetables (fruits, stems, leaves or flower plant parts for fresh consumption) of 'preferred' hots.

in consignments originating outside the European Union

Association to the pathway at origin:

P. stultana is a pest that usually feeds on leaves. Nevertheless, it attacks some fruits of `**preferred'** hosts in California and Mexico, where it is widespread. Thus, the association of *P.stultana* to this pathway at origin is high.

Category 1. Fruits of fruit trees

Fruits of the "**preferred**" hosts of *P. stultana* include kiwis, citrus, apples, plums, peaches, pomegranates, pears, blackberries and raspberries and grapes.

Larvae may feed internally or externally on fruit though external feeding damage is much more common (Yokohama et al., 1999) **Internal feeding** has been reported for **kiwis** ["Larvae may also tunnel into mature fruit" (Hasey et al., 2000), **pomegranates** ["Often, the caterpillar will tunnel into the fruit" (Carrol, 2013), **blackberries** and **raspberries** ["The primary problem caused by leafrollers is that they get into and contaminate fruit" (Hasey et al., 2000] and **grapes** ["*Platynota* can complete its life cycle within the mummified bunches" (Lynn, 1969)].

Grapes seem to be an almost ideal host for *Platynota stultana*, as the larvae feed on practically any chewable part of the vine including the greenest to the ripest berries, stems, flower clusters, leaves, young shoots, drying grapes, and raisins (Lynn, 1969)**. The risk of pest entry associated to grapes is considered higher than the rest of fruits as the pest can be carried not only internally in fruit but externally within the bunch.**

The damage to citrus, pome and stone fruit is mostly external, and thus the risk of pest entry associated to them is considered **lower**.

Trade Data

According to Datacomex, E.U imports the following fruits from the USA and Mexico in order of importance

Trade from the USA and Mexico into the E.U (t)

	2009	2010	2011	2012
Fresh or dry citrus (Taric: 0805)	99,249.2	106,226.2	109,997.6	96,153.7
Apples (Taric: 080810)	26,426.9	20,060.0	10,234.8	10,490.6
Fresh grapes (Taric: 080610)	11,837.2	10,791.9	7,966.2	6,739.2
Blackberries, Mulberries, Loganberries and Raspberries (Taric: 081020)	3,761.1	4,121.1	4,691.1	5,508.0
Pears (Taric: 08083090, 08082050)	5,829.2	3,370.3	1,769.9	1,815.4
Pomegranates, barbary figs, medlars and others (Taric: 08109075 & 08109095)	1,346.9	1,580.5	964.8	1,407.2
Peaches and Nectarines (Taric: 080930)	246.6	89.1	174.4	102.3
Plums (Taric: 08094005)	140.3	166.1	14.4	66.9
Fresh kiwi (Taric: 081050)	28.8	2.4	13.3	4.5

Source: http://datacomex.comercio.es/index.htm

Category 3. Vegetables (fruits, stems, leaves or flower plant parts for fresh consumption)

The only "**preferred**" host of *P. stultana* in this category is **sweet pepper.**

In California, *P. stultana* is among the pests likely to infest pepper plants as cited by the University of California Extension. Sweet peppers are considered an economically important host for *P. stultana* (Gilligan & Epstein, 2012). The existence of IPM guidelines indicates that it is a crop to be controlled due to *P.stultana*. This information makes the assessors assume that **the association of *P.stultana* with sweet peppers in the USA is very likely**. **Thus, consignments of sweet peppers originating in California have a high probability to be associated with the pest.**

***P. stultana* has often been found in shipments of fruits and peppers from Mexico to the United States.** (Bostanian et al., 2012)**.**

Trade Data

According to Datacomex, E.U imports the following fruits from the USA and Mexico:

Trade from the USA and Mexico into E.U(t)

	2009	2010	2011	2012
Fresh or chilled sweet peppers (Taric: 07096010)	5.2	-	2.7	28.8

Source: http://datacomex.comercio.es/index.htm

(a) There are no prohibitions for fruits in Council Directive 2000/29/EC.

(b) Pre-existing general measures outlined in Council Directive 2000/29/EC for fruits which are "preferred" hosts are:

Fruits of ***Citrus* L., *Malus* Mill., *Prunus* L. *Pyrus* L.** and ***Capsicum* L.,** shall be subject to a

plant health inspection in the country of origin, before being permitted to enter the Community. Thus, they must be accompanied by a Phytosanitary Certificate. [Annex V B I (3)]

Fruits of ***Vitis*** L, shall be subject to a plant health inspection in the country of origin, when destined to Cyprus. [Annex V B II (6a)]. It has to fulfil the requirements for *Daktulosphaira vitifoliae* outlined in [Annex IV B (21.2)].

Fruits of ***Citrus*** L, shall be free from peduncles and leaves and the packaging shall bear an appropriate origin mark. [Annex IV A I (16.2)].

Fruits of ***Capsicum*** L. originating in Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Jamaica, **Mexico**, Nicaragua, Panama, Puerto Rico, **USA** and French Polynesia where *Anthonomus eugenii* Cano is known to occur shall fulfill official statement of one within two options for *Anthonomus eugenii* Cano. [Annex IV A I (36.3)].

Consequently, those fruits which pose a higher risk of introduction since *P.stultana* can feed inside them (i.e: mainly grapes, but also kiwis, pomegranates, blackberries/rapsberries and sweet peppers), do not have any regulations, except those posed for *Vitis* to Cyprus, and those posed agains *Anthonomus eugenii* in peppers.

PIII:

Cut flowers or branches with foliage

in consignments originating outside the European Union

Association to the pathway at origin:

P. stultana is a pest that usually feeds on leaves. *"It seems probable that P. stultana was introduced in Santa Cruz Island in the early 1970s, possibly via cut flowers or potted nursery plants, and it is established on the island." (Powell, 1980).*Thus, the association of *P.stultana* to this pathway at origin is high for cut flowers.

On the other hand, none of the "preferred" hosts are commonly used as branches with foliage and the analysis of trade data has confirmed that in the last years, there have been a very low number of imports of any known hosts of *Platytona stultana* in the form of branches with foliage. **Thus, cut branches with foliage are not further considered a pathway of entry**. Nevertheless, if trade changes in the future, this pathway should be revised.

Category 2. Floriculture & Ornamental trees Cut flowers:

Cut flowers of the "**preferred**" hosts of *P. stultana* include ***Dianthus*** L. and ***Rosa*** L. Both are traded to Europe.

(a) There are no prohibitions in Council Directive 2000/29/EC.

(b) Pre-existing general measures outlined in Council Directive 2000/29/EC are:

- Council Directive 2000/29/EC lays down special requirements for cut flowers of ***Dianthus*** L. to prevent entry and spread of *Liriomyza sativae* (Blanchard) and *Amauromyza maculosa* (Malloch) [Annex IV A I (32.2)].
- Council Directive 2000/29/EC lays down special requirements for cut flowers of ***Rosa*** L. to prevent entry and spread of *Bemisia tabaci* Genn. [Annex IV A I (45.2)].
- Part of plants, other than fruit and seeds of ***Dianthus*** L., originating in third countries and cut flowers of ***Rosa*** L. originating in non-European countries shall be subject to a plant health inspection in the country of origin before being permitted to enter into the Community [Annex V B I (2)].

Trade Data

According to Datacomex, the E.U imports the following cut flowers from the USA and Mexico.

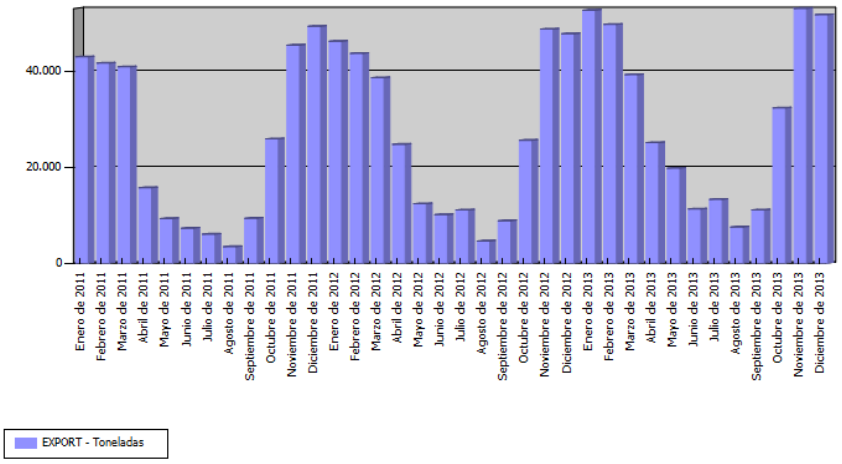
Trade from USA and Mexico into E.U(t)

	2009	2010	2011	2012
Fresh cut **roses** and buds, of a kind suitable for bouquets or for ornamental purposes (Taric: 06031100)	3.6	0.8	1.3	0.1
Fresh cut **carnations** and buds, of a kind suitable for bouquets or for ornamental purposes (Taric: 06031200)	7.5	-	0.0	9.2

Source: http://datacomex.comercio.es/index.htm

The level of risk presented by cut flowers is mainly linked to the probability of transfer to a suitable host in the PRA area. Consignments will be shipped by aircraft and end up at the final consumer within a few days. **Risk may be significant for cut flowers repacked in facilities located in the vicinity of production areas**, as the pest may reach suitable hosts either from fresh flowers or waste disposal.

(See Appendix 11"Comments on pathways") for secondary hosts

PIV: **Fruits of fruit trees; and vegetables (fruits, stems, leaves or flower plant parts for fresh consumption)** **in consignments originating in the European Union**	**Association to the pathway at origin:** ***Capsicum annuum*** L. is the only 'preferred' host in which damage has been reported in some greenhouses in Spain. It has only happened **occasionally** (up to now, expert technicians who usually survey more than 200 ha. of sweet peppers during the year still have not detected the pest in any of the greenhouses they usually visit), and **usually not attacking fruits**, and only in the province of Almería). In the province of Almería, IPM management against other Lepidoptera (e.g.: *Spodoptera exigua)* is carried out in summer (when probably 100% of the pepper are planted) with phytosanitary products 100% effective also against *P. stultana*. The use of these products may have an important incidence in hampering the establishment of the pest in the crop. These measures combined with the exclusionary insect proof systems aimed to avoid thrips, implemented in all the greenhouses destined to pepper production probably result on the current **extremely low incidence of the pest in the crop.** Nevertheless it is important to notice that even in ecological crops; there is no incidence of the pest. In the province of Murcia (according to the official information) only captures in traps have been recorded and no damage has been reported until now. **Thus, it can be concluded that the likelihood of *P. stultana* being associated with the fruits of pepper at the time of harvest is considered very low.** The pest seems to have a higher probability to be detected in peppers **whose production cycle has been unusually extended**. The normal production cycle in Almeria is between September and May. Consequently extended production cycles can be considered those that last beyond June. This must be justified due to the high foliage existing in those extended crops combining with the absence of other susceptible crops in the whole area during this period of time. Production of peppers in Almería mainly occurs during winter. Most of the imports from Spain into the North of Europe occur in the coldest months of the year, when *P.stultana* cannot survive cold winters. **FIGURE: PEPPERS EXPORTED FROM SPAIN TO NORTHERN EUROPE**  *Source: Datacomex* **Thus, the association of *P.stultana* to pepper fruits in exporting consignments is considered to be very low** **Besides, transfer to available hosts in the EU would be very difficult during that period.** Although fruits of pepper can anecdotally be attacked by the pest, taking into account (a) the **extremely low incidence of** *P. stultana* **in the crop** in Spain, (b) that it does not **usually attacks fruits of peppers; (c)** the consequently very low likelihood of *P. stultana* being associated with fruits of pepper at the time of harvest and (c) the low quantity of peppers exported in the warmest months from Spain, "**fruits of *Capsicum annuum* L. from Spain"** Regarding the personal communication concerning the interception of *P. sultana* in two consignments of peppers in the USA to which refers the Dutch PRA and is alto cited in the UK PRA, it is important to emphasize that " No intereceptions and no official communication has ever taken place from the NPPO of the USA to the NPPO of Spain regarding any interception of *Platynota stultana* in pepper consignments from Spain" Within 'secondary hosts' there have been scattered and anecdotal detections in greenhouses in aubergine, cucumber and bean, never attacking fruits.
PV: **Packaging material** **in consignments**	This covers crates or boxes used for packing host plants. Packaging carrying fruit is not mentioned in the literature as a possible pathway for this pest, but it is considered to be a pathway of *Tuta absoluta* within the EPPO region (Potting et al., 2010) and is also considered for *P. stultana*. The life stage which could most likely be associated with packaging is pupae. **Pupae** are normally formed in leaves. However, emerging mature larvae transforming to pupae in packing material may pupate at the surface of the crate or between fruits. It is not known whether packing material such as

	crates would be subjected to any management measures. Packaging used to carry host products may be used for other products while still carrying life stages of the pest. **The pest would be even more likely to remain undetected than on fruit, as inspection (if any) would mostly target the commodity itself.** **On the other hand, regarding the current status of *P. stultana* in Spain and above mentioned descriptions for the commodities, "packaging material originating in the EU" poses an almost neglictable risk.**
Natural spread within the European Union	Although *P. stultana* can fly for several miles (UC-IPM, 2014) *(1 mile =1.6093km)*, and there is a wide range of hosts (including wild hosts) that are widely distributed within the EU, *P. stultana* is spread only locally in Spain and reasonably **isolated** from outdoors crops due to the distance and the use of phytosanitary treatments against Lepidoptera which prevent the increase of population. **In Almeria**, at least in the municipalities where the pest has anecdotally been detected, there are no outdoors susceptible crops, in fact ,the nearest outdoors susceptible crops are very far away from those municipalities and only desert and mountains (more than 2000 m high) are in between. **In Murcia**, in spite of the combination of greenhouses and outdoors susceptible crops, **damages have never been reported.** Only captures in traps. Taking into account that this pattern of trap captures and no damages have been followed for several years, probably since 2008, it is not believed that the situation will change. In the case of a similar pest, *Tuta absoluta*, normally very soon after captures in traps where detected damages where found. **In Granada,** only this old (period 2005-2008) not official records in traps have been found.

Table 7: Pathways less likely and then not further considered

Pathways less likely	Short description explaining why it is considered less likely
Travelers carrying fruits or plants for planting of hosts	Regular inspections of travellers or their luggage are not carried out in the EU. Entry on fruit transported by travellers is unlikely as such fruit are likely to be intended for consumption, which limits the possibilities for transfer of the pest to a host. Transport of plants for planting with travellers is possible. **Pathway considered but not retained** Taking measures on this pathway would require a general approach for plants and plant products carried by travellers, including raising awareness and carrying out inspection (EPPO, 2012). The assessors considered that this is beyond the scope of a PRA.
Plants for planting of hosts of *P.stultana* (except seeds, bulbs and tubers) with or without soil attached **in consignments originating in the European Union**	**Association to the pathway at origin:** As stated before, ***Capsicum annuum*** L. is the only 'preferred' host in which damage has been reported in some greenhouses for fruit production in Spain. **It has never been reported in nurseries.** Thus, there is no association of *P.stultana* to plants for planting from Almería or Murcia. Consequently, **plants for planting of *C. annuum* originating in the European Union have not been further considered.** *Trade Data* According to the Spanish Horticulture Organisation ASEHOR (pers. communication) **the movement of plants for planting of horticulture crops is mainly domestic**.
Soil or growing media	Pupae may be associated with the soil but they are generally formed in plant (on leaves), not directly in the soil. Thus, **this pathway is not further considered.**
Movement of individuals, e.g. traded by collectors	The pest may circulate between collectors and entomologists, but in the latter case is most likely to be traded once dead. Fresh material for study may be circulated but is likely to be used in laboratories. Thus, **this pathway is not further considered.**

Table 8: Pathways not considered relevant* for *P. stultana*

Pathways not considered relevant* for *P. stultana*	Short description explaining why it is not considered relevant
Cut flowers or branches with foliage **in consignments originating in the European Union**	**Not considered a pathway** as the only known host is *Capsicum annuum* L., which is not traded in the form of cut flowers or branches with foliage
Processed commodities made from fruit of the hosts (e.g. dried fruit, pulp, canned preparations,	Such commodities would be processed to a degree that would not allow survival of life stages of *P. stultana*. Larvae are small and may survive pulping or cutting processes, but they are not likely to complete their development

etc.)	Thus, **this pathway is not further considered.**

***:** *Relevant pathways are those with which the pest has a possibility of being associated (in a suitable life stage), on which it has the possibility of survival, and from which it has the possibility of transfer to a suitable host.*

Rating of the likelihood of entry	
Consignments originating <u>outside</u> the European Union	
Plants for planting (cuttings, life plants and floriculture products, plants for planting not yet planted) with or without soil attached in consignments originating <u>outside</u> the European Union in countries where *P.stultana* occurs (México or the USA) Worst case: [*Dianthus caryophyllus* L. (carnation)]	**High**
Fruits of fruit trees; and vegetables (fruits, stems, leaves or flower plant parts for fresh consumption) in consignments originating <u>outside</u> the European Union Worst case: [grapes; and also kiwis, citrus, apples, plums, peaches, pomegranates, pears, blackberries/raspberries and sweet peppers]	**High:** Grapes (the pest can be carried not only internally in fruit but externally within the bunch) **Medium**: kiwis, pomegranates, blackberries / raspberries; and fruits of vegetables: sweet peppers (internal damage) **Low**- Fruits: citrus, pome and stone fruit (external damage)
Cut flowers or branches with foliage in consignments originating <u>outside</u> the European Union Worst case: *[Dianthus, Rosa, Chrysanthemum]*	**Low,** but may be significant for cut flowers repacked in facilities located in the vicinity of production areas, as the pest could reach suitable hosts either from fresh flowers or waste disposal.
Packaging material	**Low**
Consignments originating <u>in</u> the European Union	
Fruits of fruit trees; and vegetables (fruits, stems, leaves or flower plant parts for fresh consumption) in consignments originating <u>in</u> the European Union Worst case (and unique): [peppers]	**Low**
Natural spread within the European Union	**Low**
Packaging material	**Very low**
Rating of uncertainty	**Medium**

9. Likelihood of establishment outdoors in the PRA area

Rating of the likelihood of establishment outdoors *P. stultana* is a polyphagous pest and it has a great diversity of hosts widespread in the EU (see **Appendix 9**), so establishment outdoors is not limited by host availability but it could be limited by **climatic conditions.** The minimum development threshold temperature is estimated to be 8.9 ºC and the number of Degree-Days for development from egg to adult is 649 Celsius Degree-Days, according to Kido et al. model **(UC-IPM 2014)** Thus, it is expected that the establishment outdoors differs from Southern to Northern Europe: **<u>Southern Europe:</u>** In Spain the pest has been trapped with **very low captures** in the provinces of Almería and Murcia for several	**High** Mediterranean Basin and

years. In addition, it has been anecdotally detected in *Atriplex sp*. outdoors. It has never been detected damaging crops outdoors. Therefore, it seems that the pest could potentially establish outdoors in the Southern area. Nevertheless, according to what it has been observed during recent years, levels of population are so low that it is suspected that there are some reasons for which its development as a pest and its spread capacity is hampered. In this area climatic conditions are similar to California areas where *P. stultana* is currently established. In **Appendix** 8 it is shown a comparison of extreme minimal temperatures between Spain and the U.S.A. In the Mediterranean basin and Portugal there are lots of crops of host species of *P. stultana* such as citrus and grapes (main hosts). Nevertheless, as already stated, there are no damages in any crop outdoors in Spain. **Northern Europe:** Omnivorous leafroller is quiescent (**not diapausing**) during the colder winter months and **unable to survive prolonged periods of freezing**. This condition limits its range in North America and most likely can result in significant mortality in those areas where periodic winter freezes occur (Bostanian et al, 2012). Omnivorous leafrollers overwinter as immature larvae in mummy fruit or on winter weeds and do not enter a true dormancy (UC-IPM, 2014). **Mortality among larvae outdoors can be high since *P. stultana* apparently is unable to survive the winter in colder climates**. (Brown, 2013). Taking into account that *P. stultana* has been reported attacking roses in greenhouses in the North-eastern United States but the pest has never been reported attacking outdoors in these locations, it can be assumed that the same scenario case can occur **in Northern Europe, hampering its establishment outdoors.** Although transient populations in summer could occur. **In conclusion, the likelihood of establishment outdoors in the Mediterranean basin and Portugal would be high, whereas it would be low in northern Europe**. **(Appendix 8)**.	Portugal **Very low**: Rest of the PRA area but **Medium:** for transient populations provided hosts are available, due to it will be mainly sent in winter time from Spain
Rating of uncertainty	**Low**

10. Likelihood of establishment in protected conditions in the PRA area

Rating of the likelihood of establishment under protected conditions Areas where peppers are grown under protected conditions in the PRA area are likely to be at risk. Nearly half of the pepper production worldwide is produced in the Mediterranean Basin (Namesny, 2006). The management of temperatures in greenhouses maintains average temperatures between 20 and 35ºC, which is suitable for the development of the pest. In Spain, the number of greenhouses where the pest has been detected is very low and the level of infestation is rather anecdotal in all the cases. It is believed that **c**urrent phytosanitary measures carried out in the greenhouses against *Spodoptera exigua* and other Lepidoptera, especially during the summer when the majority of the peppers are starting its production cycle in Almeria, are **hampering the establishment of this species.** **Nevertheless if current phytosanitary measures change, it could easily establish under protected conditions. Thus, this worst case scenario presents a likelihood of establishment that can be rated high** Establishment is likely whenever suitable hosts are available. In the North of Europe, peppers are mainly produced in spring and summer. Thus, *P.stultana* could be able to survive spring and summer but it would not survive autumn or winter in protected conditions unless other susceptible hosts were grown during that period. In addition to this, as it is currently happening in Spain, it is probably that current phytosanitary measures carried out for other lepidopteran could be effective for *P.stultana*, without the need of additional treatments.	**High**
Rating of uncertainty Uncertainties concerning the establishment of *P. stultana* in greenhouses are rated low because controlled climatic conditions favour population development and growth of this insect.	**Low**

11. Spread in the PRA area

Rating of the magnitude of spread • *Natural spread* In the province of Almería (Spain) pepper under protected conditions is the only crop that has been attacked by *P.stultana*. On the other hand, some captures have been registered at very low levels and nearly incidental in Murcia (Spain). Subsequently it does not seem having spread out of its confinement in Almería because it has not been found attacking other crops. Therefore, as long as the management practices for other lepidopteran continues being effective against the pest in the crop, natural spread does not seem to be an important pathway. This statement is supported by the fact of the **time that has already elapsed since the pest was first detected without further spread.** It is a very different situation than the recent experience with other similar lepidopteran such as *Tuta absoluta* were the magnitude of spread was very high since the first detection.	**Low**
• *Human assisted spread* Human assisted pathways have been shown to transport the pest to different states in the USA, but no further information has been found. In addition, there have not been detections of P.stultana in neighbouring states of California despite having similar climatic conditions. *P.stultana* could be carried from one place to another with infested plants or plant products, and traded commodities) Crates which have been used to transport tomatoes have been identified as sources of movement of *T. absoluta* in the Netherlands, and a similar situation could occur for *P. stultana* in peppers.	**Medium**
• *Estimates of spread and expected spread* In the USA and Mexico, it seems that *P. stultana* has high adaptability to persist and multiply in different crops. In approximately 1960 this species apparently underwent a change in physiological tolerance and during the following several years greatly expanded its geographic and ecological range in California (Powell, 1980), but not further spread has been reported to the neighbouring states. There have been outbreaks in protected crops due to human assistance in distant states from California such as Virginia. As commented before, the first detection in the PRA area occurred in the province of Almería (Spain) under protected conditions where not spread has been observed although it have been proved that OLR can survive outdoors. In Murcia, where contidions are different due to both, outdoors and indoors suitable hosts are closed by, no damages in crops have been observed; even any spread has been recorded in traps. Consequently, **in the current conditions in Almería and Murcia the magnitude of spread is low.**	**Low**
Rating of uncertainty	**Low** (under current conditions)

12. Impact in the current area of distribution

Rating of the magnitude of impact in the current area of distribution *Economic, ecological/environmental and social impacts in the current area of distribution:* **North America** The larvae of OLR are important pests of agricultural, forest and ornamental plants, causing billions of dollars in damage annually. *P. stultana* is indigenous to north-western Mexico and south-western U.S. Over the last century it has increased its range considerably, and it is now a pest in urban, agricultural, and greenhouse situations throughout much of California. (Brown, 2009). *P. stultana* can cause serious damage in vineyards in California, USA (Bentley et al., 2000d). The main damage to grapes is caused by bunch-rot organisms which enter through larval feeding holes in the skin, and may result in at least 25% yield loss (Lynn, 1969). It is also an occasional pest of citrus in California (Grafton-Cardwell et al., 2000). In the 1980s it became a serious pest in many orchards of pomegranates in central California (LaRue, 1980) (CABI, 2014) Regarding impact in greenhouses in the USA, references found correspond to outbreaks in Pennsylvania (USA): - "In 1974 , although losses caused by the attack of this leaf roller have not been studied, its potential economic importance is considerable because it feeds on leaves, shoots and flower buds of roses" (Zenner-Polania, 1974). - In December of 2013 Platynota stultana was found causing significant damage to Cyclamen in a commercial greenhouse. "Authorities are working to develop outreach and to work with the greenhouse industry. At this time (December,2013) controls implemented at the greenhouse seem to	**High** – North America

be controlling the outbreak. (PDA, 2013). **Spain** *P. stultana* population levels are very low and there is no economic impact in Spain. No specific measures for *Platynota stultana* have been needed as the pest incidence in glasshouses is low and crops outdoors have not been reported to be attacked by the pest (except from anecdotal records on *Atriplex* sp.). Existing control measures against other lepidopteran in those crops where *P. stultana* has been detected may have a role in its control as, in some cases, the management strategy to control these other lepidopterans is similar to the strategy followed by other countries, as USA, against *P. stultana*. Nevertheless ecological grown crops have not been affected either.	**Low**- Spain
Rating of uncertainty	**Low**

13. Potential impact in the PRA area

- **Will impacts be largely the same as in the current area of distribution?** Theoretically, yes. As *P. stultana* seems to thrive better in warm climates, it is expected that there will be the same number of generations in the Mediterranean Basin area than in the area of origin. Nevertheless, no relevant damage has been reported in Spain. According to the Regional Government of Andalusia, laboratories have not received enquiries for a long period of time, which is an indicator of the low prevalence of the pest. Phytosanitary measures currently applied against other Lepidoptera pests may have an important effect on *P. stultana*, or there might be other unknown reasons for which its development as a pest and its spread capacity is hampered. According to this, although the risk is rated high there is a high uncertainty regarding this rate. Technical advice for protected crops is highly developed in most parts of the PRA area. Furthermore, cropping under protected conditions often relies on IPM strategies targeting specific pests. - **Economic impact (without environmental impact)** Losses of fruit harvest will depend on the type of crop attacked, as well as on the pests already present in that crop and how they are usually being managed. It is not known whether the timing of applications against other pests would be suitable for, hence effective against, *P. stultana.* Effective pesticides against *P. stultana* are already registered against other Lepidoptera pests in pepper crops. In addition to this, that situation could have a negative impact for trade in the future. - **Environmental consequences** Losses of fruit harvest will depend on the type of crop, as well as on the pests already present and how they are managed. It is not known whether the timing of applications against other pests would be suitable and effective against *P. stultana*. Effective pesticides against *P.* stultana are already registered against other Lepidoptera pests in pepper crops. The main environmental impact expected would be due to the use of pesticides. - **Social impact :** Minor overall	**High**
Rating of uncertainty	**High**

14. Identification of the endangered area

The pest has the potential for establishment **in greenhouses and other protected conditions in all the PRA area**, but with low likelihood as far as current phytosanitary management measures against other Lepidoptera are applied.

Outdoors establishment is higher in the Mediterranean basin and Portugal.

15. Overall assessment of risk

Likelihood of:	Rating of risk	Uncertainty	Comments
• **Entry**	**Consignments originating outside the European Union in countries where *P.stultana* occurs (México or the USA)** **High –** For Plants for planting (cuttings, life plants and floriculture products, plants for planting not yet planted) with or without soil attached in consignments	**Medium**	**The highest risk for entry is posed by plants for planting of *Dianthus* *and fruits of *Vitis vinifera* from the USA or Mexico.** *(See point 8)

	originating outside the European Union in countries where *P.stultana* occurs (México or the USA) Worst case: [*Dianthus caryophyllus* L. (carnation)] **High –** For fresh fruits of Grapes (the pest can be carried not only internally in fruit but externally within the bunch) **Medium**: For fresh fruits of kiwis, pomegranates, blackberries / raspberries; and fruits of vegetables: sweet peppers (internal damage) **Low-** For fresh fruits of citrus, pome and stone fruit (external damage) **Low _** For Cut flowers or branches with foliage in consignments originating outside the European Union (but may be significant for cut flowers repacked in facilities located in the vicinity of production areas, as the pest could reach suitable hosts either from fresh flowers or waste disposal. Worst case: *[Dianthus, Rosa, Chrysanthemum]* **Low-** For packaging material **Consignments originating in the European Union** **Low-** For fresh fruits of peppers **Low-** For natural spread **Very low**- For packaging material	**Medium**	
• **Establishment**	**Outdoors** **High** (Mediterranean Basin and Portugal) **Very low** (rest of the PRA area) but **Medium-** for transient populations provided hosts are available **Under protected conditions** **High**	**Low** **Low**	The highest risk of establishment outdoors is posed for the Mediterranean Basin and Portugal. In Almería and Murcia the pest seems to be established at very low population level, not being considered a pest. The probability of establishment under protected conditions will mainly depend on the availability of hosts and the management practices already existing. (See point 10)
• **Spread**	**Low** – Natural spread **Medium** – Human assisted spread **Low** – Estimates and expected spread	**Low** (under current conditions)	Although it was introduced in Spain several years ago, it has not spread during these years.
• **Impact in the current area of distribution**	**High -** North America **Low** - Spain	**Low**	In spite of the time elapsed, the pest does not seem to cause any damage in the regions and crops where it is currently present in Spain.
• **Potential impact in the PRA area**	**High**	**Medium**	Conditions might change due to future restrictions of active substances or changes in the management because of the introduction of another new pest. In Spain, the impact remains being negligible.

As a consequence, phytosanitary measures are necessary.

Stage 3. Pest risk management

16. Phytosanitary measures

In the entry section (8) of this document, relevant pathways were identified. **Potential measures** for them and their expected effectiveness and feasibility on preventing introduction and/or spread are shown below, taken into account those provided in the PM 5/5(1) of EPPO, and the guidance provided in (EFSA Panel on Plant Health (PLH), 2012)

-Pathways identified for phytosanitary measures:

- **PI: Plants for planting (cuttings, life plants and floriculture products, plants for planting not yet planted) with or without soil attached** of ***Dianthus caryophyllus*** L. (carnation) and **Chrysanthemum** L. [=Dendranthema (DC.)Des Moul], and ***Convolvulus*** L. (bindweed), ***Malva*** L. (mallow), and ***Pelargonium*** L'Hér.ex Aiton(Geraniaceae) in consignments originating outside the EU. **(Usually traded as cuttings)**
- **PII: Fruits and vegetables:** Fruits of tree fruits and fruits of vegetables of the '**preferred'** hosts of *P. stultana,* **kiwis, citrus, apples, plums, peaches, pomegranates, pears, blackberries and raspberries, grapes** and **sweet peppers** originating outside the EU.
- **PIII: Cut flowers** of ***Dianthus, Rose*** **and** ***Chrysanthemum*** originating outside the EU.
- **PIV: Fruits of sweet peppers** originating in the EU.
- **PV: Fruit packaging**.

MEASURES FOR PATHWAY:

PI: Plants for planting (cuttings, life plants and floriculture products, plants for planting not yet planted) with or without soil attached of ***Dianthus caryophyllus*** L. (carnation) and **Chrysanthemum** L. [=Dendranthema (DC.)Des Moul], and ***Convolvulus*** L. (bindweed), ***Malva*** L. (mallow), and ***Pelargonium*** L'Hér.ex Aiton(Geraniaceae) in consignments originating outside the EU.		
Measures identified	**Effectiveness**	**Feasibility**
Options at the place of production		
1- Detection of the pest at the place of production by inspection or testing There are no tests for detecting *P.stultana* Visual inspection: According to CABI, 2013, the pest or its symptoms are usually visible to the naked eye. Nevertheless, detection by visual inspection is unlikely to be completely effective and needs to be used within a systems approach.	Medium (useful in a systems approach)	High
2- Prevention of infestation of the commodity at the place of production		
2.1-Specified treatment of the crop Suitable treatments will reduce pest populations, but they do not eliminate the pest. Treatments are not sufficient on their own, but could be used as part of a systems approach.	Medium. (useful in a systems approach)	High
2.2.- Resistant or less susceptible varieties As far as it is known, there are no resistant or less susceptible varieties	-	No
2.3. - Growing the crop in specified conditions, Plants for planting can be grown under complete physical protection (screened greenhouses) with sufficient measures to exclude the pest Trapping shall be necessary to verify pest freedom in the greenhouse.	Medium. (useful in a systems approach)	High
2.4.- Preparing the commodity at certain times of the year or growth stages Plants in vitro or produced at early growth stages could reduce the risk of *P.stultana* Dormant plants without fruits and leaves could reduce the risk of *P.stultana* in deciduous hosts. Since there are not deciduous hosts identified in this pathway, this measure will not be evaluated.	High	High
2.5. Production in a Certification scheme Not applicable for insects	-	No

3- Pest-free Place of Production (PFPP):Establishment and maintenance Plants for planting originated in a place of production declared free from the pest on official inspections carried out at appropriate times. Trapping shall be necessary to verify pest freedom	Medium	Medium
4-Pest-free area (PFA) The requirements for the establishment of a pest-free area are outlined in ISPM No. 4	High	Low (in infested States) High (in distant states from the infested ones)
5-Pest-free country México and the U.S.A are not free from *P.stultana*, so it is not a feasible measure	High	No
Options after harvest, at pre-clearance or during transport		
6- Pest freedom: Detection of the pest in consignments by inspection or testing There are no tests for detecting *P.stultana* Visual inspection: According to CABI, 2013, the pest or its symptoms are usually visible to the naked eye. Nevertheless, detection by visual inspection is unlikely to be completely effective.	Low (useful in a systems approach)	High
7- Removal of the pest from the consignment by treatment or other phytosanitary procedures		
7.1-Treatment of the consignment Suitable treatments will reduce pest populations, but they do not eliminate the pest. Treatments are not sufficient on their own, but could be used as part of a systems approach.	Medium. (useful in a systems approach)	High
7.2- Prohibition of parts of the hosts or specific genotypes of the host (Removal of certain parts) Plants without leaves will considerably reduce the risk of introduction. Since there are not deciduous hosts identified in this pathway, this measure will not be evaluated. In vitro plants, have been taken into account in 2.4.	-	-
7.3- Preparation of the consignment (Handling and packaging) Handling and packing should be done also in isolated conditions and transport should be carried out avoiding infestation. This measure might prevent infestation but can not reduce the existing infestation level.0	Low (useful in a systems approach)	High0
7.4. Specific conditions in the packinghouse Traps in the packinghouse can be a useful indicator for checking the absence of *P. stultana.* (It has been proved to be a very efficient measure for the detection of *Tuta absoluta*, although levels of infestation in the tomatos were high, and it is not what occurs in peppers from Spain)	Medium	High
7.5- Specific conditions during transport Tortricids are very resistant to cold conditions. This measure might reduce the development rate of the pest. This fact may complicate inspection at the point of entry. No other transport conditions, but cold, have been identified having influence in the pest.	-	-
7.6- Pre-entry quarantine system Since they are perishable products, this measure can not be considered (taded as cuttings)	-	-
8- Phytosanitary Certificate and other compliance methods. Attestation by the exporting country that the requirements of the importing country have been fulfilled is implemented by IPPC members.	No scientific publications were found in their support as a Risk Reduction Option (EFSA, 2012)	High
Options that can be implemented after entry of consignments:		
9- Detection during post entry quarantine Since they are perishable products, this measure can not be considered (traded as cuttings)	-	-
10- Restriction on end use, distribution and periods of entry Entry of plants for planting in winter in the north of Europe, poses a lower risk than for the rest of the year with the exception of under protected conditions. Additionally, once introduced in a northern EU country, movement of the consignments within the EU to the southern part of Europe can not be controlled.	Low (due to internal market within the EU)	Low (due to internal market within the EU)

Prohibition Although effectiveness of prohibiting this pathway would be high, it is not a feasible option	High	Low

MEASURES FOR PATHWAY:

PII: Fruits and vegetables: Fruits of tree fruits and fruits of vegetables of the '**preferred'** hosts of *P. stultana*, **kiwis, citrus, apples, plums, peaches, pomegranates, pears, blackberries and raspberries, grapes** and **sweet peppers** originating outside the EU.		
Measures identified	**Effectiveness**	**Feasibility**
Options at the places of production		
1- Detection of the pest at the place of production by inspection or testing (See pathway P.I)	Medium. (useful in a systems approach)	High
2- Prevention of infestation of the commodity at the place of production		
2.1-Specified treatment of the crop Suitable treatments will lower pest populations, but they do no eliminate the pest. Treatments are not sufficient on their own, but could be used as part of a systems approach. Effectiveness will be lower than in plants for planting since the size of the plants treated are higher and the pest can find more places to hide avoiding treatment exposure. In the case of internal feeders effectiveness would be very low.	Low (useful in a systems approach) High (in protected crops)	High
2.2.- Resistant or less susceptible varieties As far as it is known, there are no resistant or less susceptible varieties	-	No
2.3.- Growing the crop in specified conditions, 2.3.1. Screened greenhouses: Only few hosts identified in this pathway can be grown under complete physical protection with sufficient measures to exclude the pest (i.e.: sweet peppers). (draft EPPO standard) However, arboreal host's profitability under physical protection conditions is questionable.	Medium (useful in a systems approach)	Low: for arboreal trees High for sweet peppers and other herbaceous hosts.
2.3.- Growing the crop in specified conditions, 2.3.2. Cultural measures: Bagging fruits in the tree to prevent infestation Since *P.stultana* can attack fruits previous to its complete development, it is not a feasible measure.	-	No
2.4.- Harvest at certain times of the year or growth stages Since *P.stultana* can be associated with fruits in any marketable stage it is not a feasible measure.	-	No
2.5. Production in a Certification schemes Not applicable for insects	-	No
3- Pest-free place of production (PFPP): Establishment and maintenance Fruits and vegetables originated in a place of production declared free from the pest on official inspections carried out at appropriate times. Trapping shall be necessary to verify pest freedom	Medium	Medium
4-Pest-free area (PFA) The requirements for the establishment of a pest-free area are outlined in ISPM No. 4	High	Low (in infested States) High (in distant states from the infested ones)
5-Pest-free country México and the U.S.A are not free from *P.stultana*, so it is not a feasible measure	High	No
Options after harvest, at pre-clearance or during transports		
6- Pest freedom: Detection of the pest in consignments by inspection or testing (See Pathway P-I) In the case of fruits in which OLR can act as internal feeder detection by visual inspection can be even more difficult.	Low (useful in a systems approach)	High
7- Removal of the pest in the consignment by treatment or other phytosanitary procedures	In a systems approach	

7.1-Treatment of the consignment Currently, it is applied a treatment for packed table grapes, using a combination of low temperature storage and slow release of sulphur dioxide pads against *Platynota stultana* (EPPO, 2002)	Medium. (useful in a systems approach)	High
Mexico includes a treatment with Methyl Bromide in the Work Plan for stone fruit from the USA to Mexico. (SAGARPA, 2009). This option is not feasible in the UE. No treatments for the rest of the hosts are known by the assessors.	High	No
7.2. Prohibition of parts of the hosts or specific genotypes of the host_(Removal of certain parts Fruits without leaves may reduce the risk but the pest can also be associated with the fruits themselves.	Low (under a systems approach)	High
7.3. - Preparation of the consignment (Handling and packaging) (See pathway P-I)	Low (useful in a systems approach)	High
7.4. Specific conditions in the packinghouse Traps in the packinghouse can be a useful indicator for checking the absence of *P. stultana.* (It has been proved to be a very efficient measure for the detection of *Tuta absoluta*, although levels of infestation in the tomatos were high)	Medium	High
7.5. Specific conditions or treatments during transport (See pathway P-I)	-	-
7.6- Pre-entry quarantine system (See pathway P-I)	-	-
8- Phytosanitary Certificate and other compliance methods. (See pathway P-I)	No scientific publications were found in their support as a Risk Reduction Option (EFSA, 2012)	High
Options that can be implemented after entry of consignments:		
9- Detection during post entry quarantine (See pathway P-I)	-	-
10- Restriction on end use, distribution and periods of entry Entry of fruits in winter in the north of Europe, poses a lower risk than for the rest of the year. Nevertheless, it is not possible to avoid the introduction under protected conditions, or the movement within the EU to the southern part of Europe. Additionally, fruits intended for industrial purposes pose a lower risk, but it is difficult to establish a systematic control of all the imports due to the internal market within the EU.	High (due to internal market within the EU)	Low (due to internal market within the EU)
Prohibition Although effectiveness of prohibiting this pathway would be high, it is not a feasible option	High	Low

MEASURES FOR PATHWAY:

PIII: Cut flowers of ***Dianthus, Rose*** **and** ***Chrysanthemum*** in originating outside the EU.		
Measures identified	**Effectiveness**	**Feasibility**
Options at the places of production		
1-Detection of the pest at the place of production by inspection or testing (See pathway P-I)	Medium. (useful in a systems approach)	High
2- Prevention of infestation of the commodity at the place of production		
2.1-Specified treatment of the crop Suitable treatments will lower pest populations, but they do no eliminate the pest. Treatments are not sufficient on their own, but could be used as part of a systems approach. Effectiveness will be lower than in plants for planting since the size of the plants treated are higher and the pest can find more places to hide avoiding treatment exposure.	Medium. (useful in a systems approach)	High
2.2.- Resistant or less susceptible varieties (See pathway P-I)	-	No

2.3. - Growing the crop in specified conditions, (See pathway P-I)	Medium. (useful in a systems approach)	High
2.4.- Preparing the commodity at certain times of the year or growth stages Since *P.stultana* can be associated with cut flowers in any marketable stage it is not a feasible measure.	-	No
2.5. Production in a Certification scheme Not applicable for insects	-	No
3- Pest-free Place of Production (PFPP):Establishment and maintenance Cut flowers originated in a place of production declared free from the pest on official inspections carried out at appropriate times. Trapping shall be necessary to verify pest freedom	Medium	Medium
4-Pest-free area (PFA) (See pathway P-I)	High	Low (in infested States) High (in distant states from the infested ones)
5-Pest-free country (See pathway P-I)	High	No
Options after harvest, at pre-clearance or during transport		
6- Pest freedom: Detection of the pest in consignments by inspection or testing (See pathway P-.I)	Low (useful in a systems approach	High
7- Removal of the pest in the consignment by treatment or other phytosanitary procedures		
7.1-Treatment of the consignment (See pathway P-I)	Medium. (useful in a systems approach)	High
7.2. Prohibition of parts of the hosts or specific genotypes of the host (Removal of certain parts) Although cut flowers without leaves would considerably reduce the risk of introduction, the commodity is not marketable in that way. Thus, this measure will not be evaluated.	-	-
7.3. -Handling and packaging (See pathway P-I)	Low (useful in a systems approach)	High
7.4. Specific conditions in the packinghouse Traps in the packinghouse can be a useful indicator for checking the absence of *P. stultana.* (It has been proved to be a very efficient measure for the detection of *Tuta absoluta*, although levels of infestation in the tomatos were high, and it is not what occurs in peppers from Spain)	Medium	High
7.5. Specific conditions or treatments during transport (See pathway P-I)	-	-
7.6. Pre-entry quarantine system (See pathway P-I)	-	-
8- Phytosanitary Certificate and other compliance methods (See pathway P-I)	No scientific publications were found in their support as a Risk Reduction Option (EFSA, 2012)	High
Options that can be implemented after entry of consignments:		
9- Detection during post entry quarantine (See pathway P-I)	-	-
10- Restriction on end use, distribution and periods of entry Entry of cut flowers in winter in the north of Europe, poses a lower risk than for the rest of the year. Nevertheless, it is not possible to avoid the introduction under protected conditions, or the movement within the EU to the southern part of Europe.	Low (due to internal market within the EU)	Low (due to internal market within the EU)
Prohibition Although effectiveness of prohibiting this pathway would be high, it is not a feasible option	High	Low

MEASURES FOR PATHWAY:

PIV: Fruits of sweet peppers originating in the UE		
Measures identified	**Effectiveness**	**Feasibility**
Options at the places of production		
1- Detection of the pest at the place of production by inspection or testing There are no tests for detecting *P.stultana* Visual inspection: According to CABI, 2013, the pest or its symptoms are usually visible to the naked eye. Nevertheless, detection by visual inspection is unlikely to be completely effective.	Medium. (useful in a systems approach)	High
2- Prevention of infestation of the commodity at the place of production		
2.1-Specified treatment of the crop In crops of pepper in greenhouses of Spain, OLR mainly attacks leaves and it is rarely found hiden in fruits. Therefore, it is probably that treatments against other Lepidopteran are highly efficient against OLR. A targeted treatment would consequently be considered as highly effective.	High	High
2.2.- Resistant or less susceptible varieties As far as it is known, there are no resistant or less susceptible varieties	-	No
2.3.- Growing the crop in specified conditions, 2.3.1. Screened greenhouses: complete physical protection with sufficient measures to exclude the pest (draft EPPO standard)	Medium (useful in a systems approach)	High
2.4.- Harvest at certain times of the year or growth stages Since *P.stultana* can be associated with fruits in any marketable stage it is not a feasible measure.	-	No
2.5. Production in a Certification schemes Not applicable for insects	-	No
3- Pest-free place of production (PFPP): Establishment and maintenance Fruits and vegetables originated in a place of production declared free from the pest in official inspections carried out at appropriate times. Trapping shall be necessary to verify pest freedom	High (There are many greenhouses were *Platynota stultana* has never been detected)	High
4-Pest-free area (PFA) The requirements for the establishment of a pest-free area are outlined in ISPM No. 4	High	High (in municipalities, provinces were the pest has not been detected)
5-Pest-free country Spain is not free from *P.stultana*, so it is not a feasible measure	High	No
Options after harvest, at pre-clearance or during transports		
6- Pest freedom: Detection of the pest in consignments by inspection or testing Visual inspection: According to CABI, 2013, the pest or its symptoms are usually visible to the naked eye. Nevertheless, detection by visual inspection is unlikely to be completely effective. As it usually feeds in leaves, its low prevalence in fruits makes it difficult to be detected in them. In addition, in the anecdotal event of attacking a fruit, OLR can act as internal feeder, so detection by visual inspection can be even more difficult.	Low (high volumes of fruits, and very low prevalence of the pest in the fruits)	High
7- Removal of the pest in the consignment by treatment or other phytosanitary procedures	In a systems approach	
7.1-Treatment of the consignment No treatments for peppers are known by the assessors	High	No
7.2. Prohibition of parts of the hosts or specific genotypes of the host (Removal of certain parts Fruits without leaves may reduce the risk but the pest can also be anecdotally associated with the fruits themselves.Peppers are usually traded without leaves.	Low (under a systems approach)	High
7.3. - Preparation of the consignment (Handling and packaging) Handling and packing should be done also in isolated conditions and transport should be carried out avoiding infestation. This measure might prevent infestation but can not reduce the existing infestation level.	Low (useful in a systems approach)	High
7.4. Specific conditions in the packinghouse Traps in the packinghouse can be a useful indicator for checking the absence of *P. stultana.* (It has been proved to be a very efficient measure for the detection of *Tuta absoluta*, although levels of infestation in the tomatos were high, and it is not what occurs in peppers from Spain)	Medium	High
7.5. Specific conditions or treatments during transport Tortricids are very resistant to cold conditions. This measure might reduce the development rate of the pest. This fact may complicate inspection at the point of entry. No other transport conditions, but cold, have been identified having influence in the pest.	-	-

7.6- Pre-entry quarantine system Since they are perishable products, this measure can not be considered	-	-
8- Phytosanitary Certificate and other compliance methods. Attestation by the exporting country that the requirements of the importing country have been fulfilled is implemented by IPPC members.	No scientific publications were found in their support as a Risk Reduction Option (EFSA, 2012)	High
Options that can be implemented after entry of consignments:		
9- Detection during post entry quarantine Since they are perishable products, this measure can not be considered	-	-
10- Restriction on end use, distribution and periods of entry Entry of fruits in winter in the north of Europe, poses a lower risk than for the rest of the year. Nevertheless, it is not possible to avoid the introduction under protected conditions, or the movement within the EU to the southern part of Europe. Additionally, fruits intended for industrial purposes pose a lower risk, but it is difficult to establish a systematic control of all the imports due to the internal market within the EU.	High (due to internal market within the EU)	Low (due to internal market within the EU)
Prohibition Although effectiveness of prohibiting this pathway would be high, it is not a feasible option	High	Low

MEASURES FOR PATHWAY:

PV: Fruit packaging		
Measures identified		
1.- Use of new packaging at origin, and packaging destruction or disposal of safely at import. Combined with the plants for planting and fruit pathways.	High	High

OUTBREAKS- Measures for surveillance (delimitation), containment and eradication		
Measures identified		
- Surveillance (delimitation) Since there are sex pheromone traps available, captures can delimitate the area where OLR is present. Additionally visual inspections in the place of production can verify the presence of the pest. According to the bibliography traps are the most common way to encounter adults and they are very distinct and readily identifiable.		
- Eradication / Containment Despite it is known for more than one hundred years, there are only references in Sonora and San Luis Potosí (México) and in several states of the USA. Outbreaks in greenhouses in some northern states of the USA (e.g.: Virginia) have been eradicated in some cases and in all of them containment seems to have been achieved. This information is consistent with the situation of the outbreak in the UK. Regarding the situation in Spain, the spreading of the pest has been very limited since it was first reported. Consequently, it is thought that the containment strategy could be achieved	High	Low
- Public awareness	Medium	High

UNCERTAINTY:

Main uncertainties are the following:

- Biology of the pest: upper development temperature, number of generations in the Mediterranean Basin.
- Changes in physiological tolerance to greatly expand its geographical and ecological range.
- Inability to survive prolonged periods of freezing

- Way of introduction in Northern States of the USA.
- Detailed data on trade of ornamental plants have not been found.
- Presence of the pest in other countries but still not detected.
- Although it does not seem probably, it is not really known if the pest would be able to withstand not warm winters.
- Discordant information is shown in CABI about injury of *P. stultana* in kiwi: (a) On *Actinidia deliciosa* (***kiwifruit)***, Omnivorous leafroller and the other leafrolling caterpillars directly damage fruit by scarring the surface when they feed (UC-IPM, 2014). (b) In CABI description of *P. Stultana* there is a cross-reference that literally says: *"On kiwi fruit …larvae may also tunnel into mature fruit* (Hasey et al., 2000)*"*. But when the cited reference *"*(Hasey et al., 2000)*"* is accessed, this information cannot be found.
- *Medicago sativa* (alfalfa) is 'main' host in CABI, but the only description of damage cited was reported in 1957**. No subsequent reports of damage have been founded.**
- *Zea mays* (maize) is 'main' host in CABI, but the only description of damage cited was reported in 1983**.** (Brown et al., 2008) citing (Powell, 1983) **No subsequent reports of damage has been founded.**

18. Remarks

- Pest Quarantine Retrieval (PQR) Database should update hosts. It only shows *Zea mays* as "unclassified host".
- It would be useful if stakeholders and growers of susceptible hosts (e.g.: vines, citrus, pomegranates) are informed about this pest.

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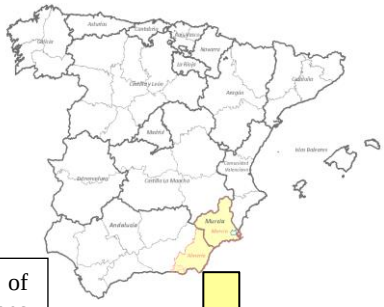
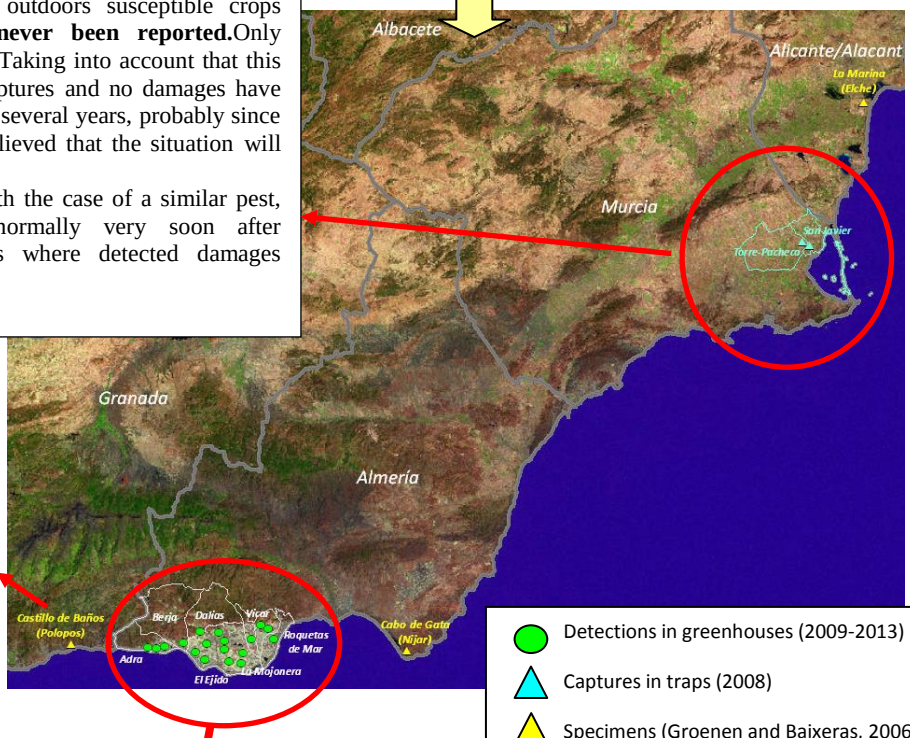
APPENDICES:

APPENDIX 1: SITUATION OF *P. stultana* IN SPAIN



In Murcia, in spite of the combination of greenhouses and outdoors susceptible crops **damages have never been reported.**Only captures in traps. Taking into account that this pattern of trap captures and no damages have been followed for several years, probably since 2008, it is not believed that the situation will change.
In comparison with the case of a similar pest, *Tuta absoluta* normally very soon after captures in traps where detected damages where found.



In Granada, only this old (period 2005-2008) not official record in traps has been found.

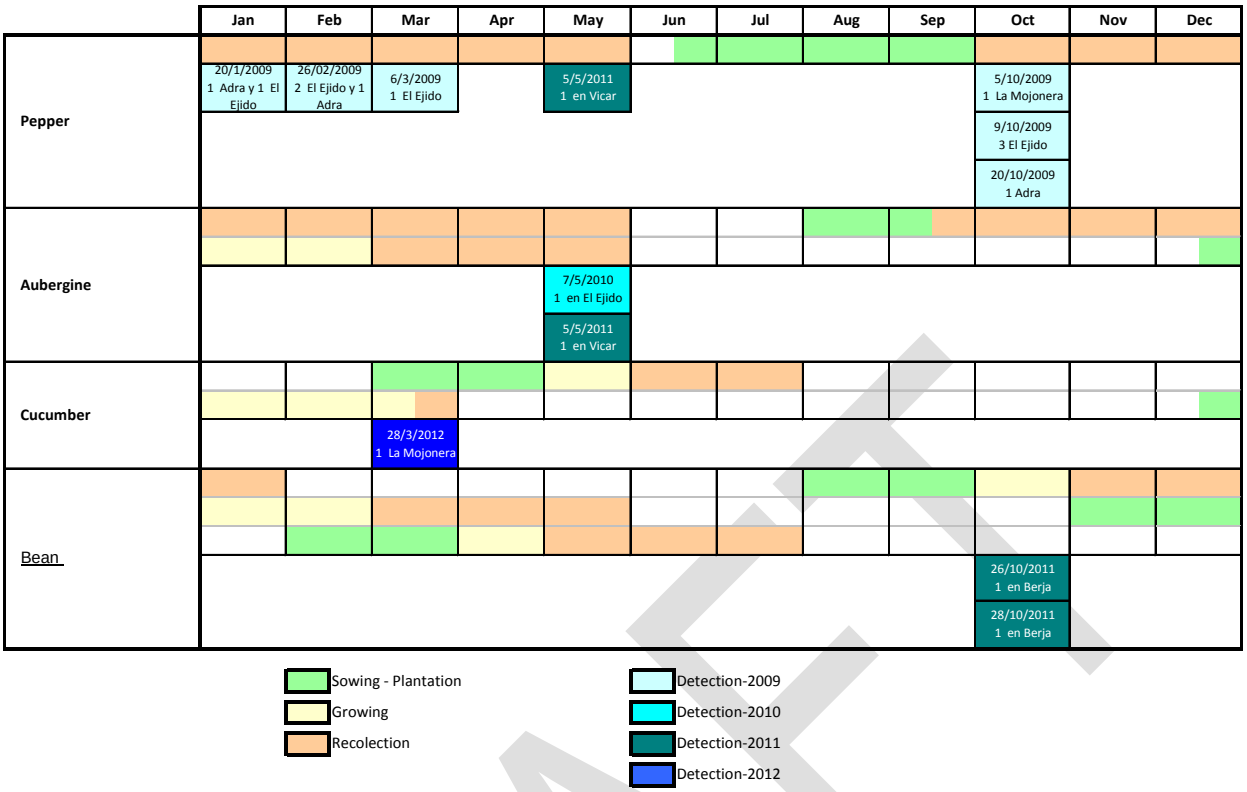
Detections in greenhouses (2009-2013)

Captures in traps (2008)

Specimens (Groenen and Baixeras, 2006) **[Not official information]**

In Almería, at least in the municipalities where the pest have been anecdotically detected there are not outdoors susceptible crops, in fact the nearest outdoors susceptible crops are very far away from that municipalities and only desert and high mountain (more than 2000 m are in between).

APPENDIX 2: *P. stultana* DETECTIONS IN THE PROVINCE OF ALMERÍA (SPAIN) 2009-2012



-During 2012-2013: More than 600 prospections: Only 1 detection

Attacks have been reported mainly in leaves. Only scattered cases

APPENDIX 3: TRAPS AND SURVEYS IN THE PROVINCE OF ALMERÍA.

Table 3.1.- Total capture records with pheromone **traps** in the Province of Almería (2010-2011)

TRAP	X	Y	MUNICIPALITY	CAPTURES 2010	CAPTURES 2011
1	509.858	4.076.879	Dalias	0	7
2	503.325	4.075.304	Berja	2	21
3	504.977	4.067.827	Adra	32	43
4	518.057	4.064.308	El Ejido	1	8
5	526.483	4.071.380	La Mojonera	57	61
6	524.947	4.072.204	El Ejido	39	25
7	52.306	4.071.465	El Ejido	22	70
8	499.996	4.068.051	Adra	**268**	**229**
9	528.842	4.068.871	La Mojonera	4	5
10	527.093	40.674.445	La Mojonera	62	142
11	535.439	4.072.309	Roquetas	26	29
12	495.209	4.067.177	Adra	58	314
13	512.209	4.068.367	El Ejido	11	22
14	515.067	4.068.980	El Ejido	**281**	**206**
15	515.072	4.064.962	Matagorda		50
16			Vicar	0	62

There are no data related to year 2012.

In 2013, 2 traps were installed in the municipalities of Adra and El Ejido. They registered captures.

Table 3.2.- Distribution of *P.stultana* in Almería and results of the surveys carried out by technicians of the Plant Health Service. (2009-2012)

GREENHOUSE	CROP	MUNICIPALITY	POL.	PARCELA	No. of positives
1	Almería	El Ejido	15	482	4
2	Almería	Adra	34	786	2
3	Almería	El Ejido	18	307	1
4	Almería	El Ejido	27	161	1
5	Almería	Adra	36	168, 169, 170	1
6	Almería	El Ejido	14	860	1
7	Almería	La Mojonera	7	32	1
8	Almería	El Ejido	16	136	10
9	Almería	El Ejido	16	136	1
10	Almería	El Ejido	16	136	7
11	Almería	Adra	33	128	1
12	Almería	El Ejido	41	120	4
13	Almería	Vicar	10	243, 248, 250	10
14	Almería	Vicar	10	243, 248, 250	1
15	Almería	Berja	35	420	2
16	Almería	El Ejido	11	114	1

Table 3.3- Distribution of *P.stultana* in Almería and private consultations resolved by the official laboratory. (2009-2012)

SAMPLE	CROP	MUNICIPALITY	Date	No. of positives
1	PEPPER	El Ejido	17/02/2009	3
2	PEPPER	El Ejido	17/09/2009	2
3	PEPPER	El Ejido	22/09/2009	1
4	EGGPLANT	Roquetas de Mar	17/05/2010	3
5	PEPPER	Vícar	13/07/2011	9

APPENDIX 4: TRAPS IN DIFFERENT AREAS OF THE REGION OF MURCIA.

Table 4.1.- Captures/trap/day in different areas of the Region of Murcia

	ÁGUILAS		SAN JAVIER	TORRE PACHECO	LORCA	MAZARRÓN
DATE	AREJOS	LA MARINA	EL MIRADOR	TORRE PACHECO	LORCA	CAÑADA GALLEGO
	Delta Trap	Delta Trap	Delta Trap	Delta Trap	Delta Trap	Delta Trap
15-jan	0	1	0	0	0	0
15-jan	0	0	0	0	0	0
29-jan	0	0	0	0	0	1
05-mar	0	0	0	0	0	2
12-mar	0	4	0	0	0	2
20-mar	0	0	0	3	0	1
03-apr	0	0	0	0	0	4
09-apr	2	1	0	0	0	4
23-apr	0	1	0	2	0	6
07-may	0	0	0	0	0	0
14-may	0	0	0	3	0	2
22-may	0	0	0	0	0	0
28-may	0	0	0	0	0	0
04-jun	0	0	0	0	0	4
12-jun	0	0	1	0	0	3
18-jun	1	0	0	0	0	9
26-jun	0	0	0	0	0	5
17-jul	0	0	0	0	0	0
25-jul	0	0	0	0	0	0
30-jul	0	0	0	0	0	4
08-aug	0	0	0	0	0	2
13-aug	0	0	0	0	0	0
20-aug	0	1	0	0	0	0
27-aug	0	0	0	0	0	0
03-sep	0	0	0	0	0	0
10-sep	0	0	0	0	0	0
19-sep	0	0	0	0	0	0
24-sep	1	0	0	0	0	1
Total 8 months	**4**	**8**	**1**	**8**	**0**	**50**

Figure 1. CURVE FLIGHT OF *Platynota stultana* IN MURCIA

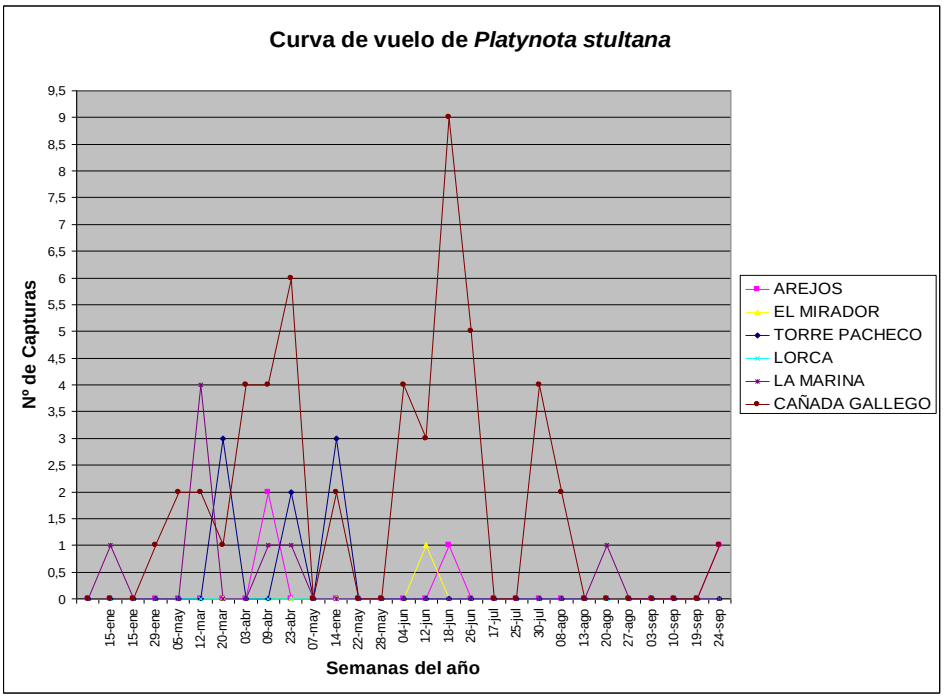
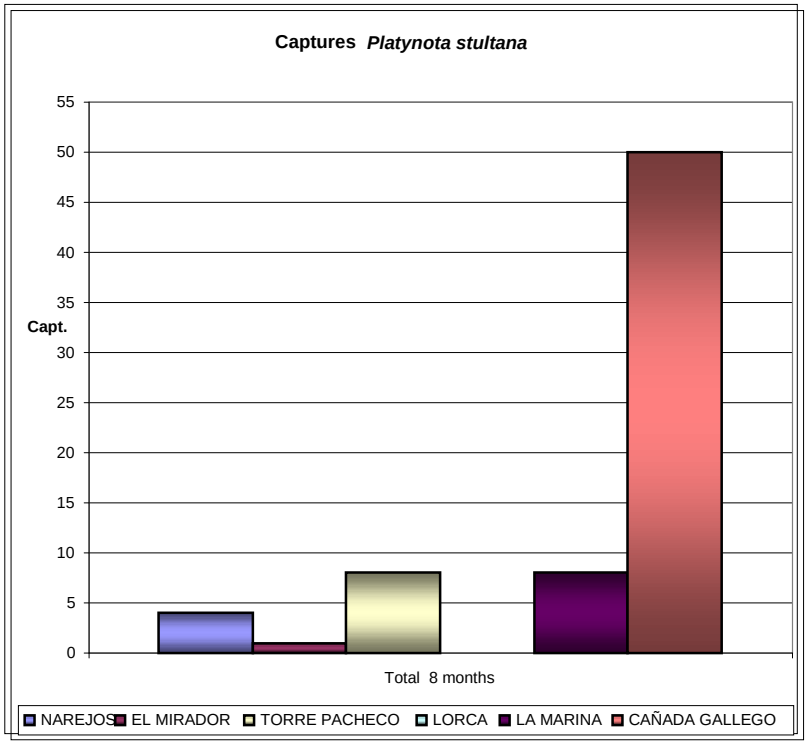


Figure 2. TOTAL CAPTURES/TRAP OF *Platynota stultana* AFTER 8 MONTHS MONITORING.



APPENDIX 5: TEMPERATURE AND RELATIVE HUMIDITY THRESHOLDS AND PREFERENCES

Temperature and relative humidity thresholds and preferences

Eggs

The incubation period is the time elapsed between the oviposition, and the moment the first larva emerged.

The effect of constant and alternating temperatures on the egg development and survival of the OLR under both laboratory and greenhouse conditions have been studied by (Zenner-Polania, 1974) and is showed in the following table.

Effect of temperature on the egg deve1opment and surviva1 of the OLR.

Temp (ºC)	Nº of eggs incubated	Incobated period (days)	% of total hatch	% non-viable eggs	% unhatched viable eggs	% hatch(total)
Laboratory						
10[a]	5857	No development				
15[a]	4214	28.0 ± 2.1	58.8 ± 16.6	8.2 ± 6.7	16.7 ± 13.4	75.2 ± 14.4
20	6538	12.0 ± 0.5	85.3 ± 11.2	3.8 ± 7.5	5.6 ± 7.7	90.4 ± 10.4
25	6731	6.7 ± 0.2	78.4 ± 20.9	6.9 ± 11.3	7.7 ± 9.1	85.3 ± 16.4
30	5656	4.8 ± 0.3	75.1 ± 21.4	5.9 ± 12.3	7.5 ± 11.7	86.2 ± 17.7
35[a]	9430	4.3 ± 0.1	63.9 ± 18.1	2.0 ± 3.5	11.1 ± 10.5	86.7 ± 12.4
19[b]	11997	12.3 ± 0.4	89.7 ± 10.9	0.8 ± 1.8	3.3 ± 3.7	95.7 ± 4.1
20.5[b]	4212	10.0 ± 0.5	69.9 ± 24.7	9.5 ± 11.4	5.8 ± 6.9	85. ± 12.4
23[b]	11199	8.8 ± 0.4	86.8 ± 15.6	1.5 ± 5'.3	4.0 ± 6.5	94.4 ± 8.9
Greenhouse						
21.1[b]	2240	9.8 ± 0.5	-	-	-	86.3 ± 8.1

[a] eggs laid at 25 º C
[b] mean fluctuating temperatura

According to (Zenner-Polania, 1974), no hatch was recorded for the egg masses incubated at lOºC, but up to the highest temperature an apparently normal hatch was observed. The incubation period decreased from 28 to 4 days as the temperature increased from 15 to 35 ºC. The egg masses laid and incubated in the greenhouse at a mean fluctuating temperature of 2l.l ºC developed only slightly faster than those at the mean fluctuating temperature of 20.5 º C in the laboratory.

According to (CABI, 2014) the duration of incubation time is directly affected by temperature. In the greenhouse the incubation period varied from 5.3 days at 32.2°C to 9.2 days at 21.1°C.

Temperature and relative humidity thresholds and preferences

Larvae

Larval mortality at the different instars and temperatures has been studied by *Zenner-Polania* in *1974* and is showed in the following table.

Temperature ºC	Larval instars							**Total larval mortality**
	1st	2nd	3rd	4th	5th	6th	7th	
Laboratory								
10	100.0							100.0
15	13.7	5.8	1.9	0	0	5.8	13.7[a]	41.1
20	3.8	5.7	0	0	0	0		9.6
25	1.6	1.6	0	0	0	0		3.3
30	3.0	0	0	0	0	0		3.0
35	1.6	0	0	0	0	1.6		3.3
19[b]	1.6	1.6	0	0	0	0		3.2
20.5[b]	2.0	0	0	0	0	0		2.0
23[b]	3.2	4.9	0	0	0	0		8.1
Greenhouse								
20[b]	50.0	4.0	0	0	0	0		54.0

[a] only at 15ºC were several larvae observed to enter a seventh instar
[b] mean flutuation temperature

According to (Zenner-Polania, 1974), none of the larvae in the 10 ºC chamber established a feeding site and a100 per cent mortality was observed in the first instar. For the other temperature treatments mortality was highest for the first and second instar in general and 100 per cent survival was observed for the fourth and fifth instar larvae. Insect pests that have originated in the tropical and sub tropical zones lack the capacity to become dormant at a

Temperature and relative humidity thresholds and preferences

certain stage to survive exposures to temperatures below the range favorable for development.

The OLR is of subtropical origin, does not have a dormant stage and is therefore unable to survive cold winters outdoors (Zenner-Polania, 1974)

According to (CABI, 2014), the larval development lasts on average 20.0 days at 32.2°C, 24.9 days at 26.7°C and 30.8 days at 21.1°C.

Pupae

Effect of temperature on the developmental time in daya and the mortality of the pupae of the OLR has been studied by (Zenner-Polania, 1974).:**Effect of temperature on the developmental time in daya and the mortality of the pupae of the OLR**

Temp (ºC)	Nº observed	Males	Nº Observed	Type A Females	Nº Observed	Type B females	Both sexes	% Mortality both sexes
Laboratory								
15	12	32.9 ± 2.4	-	-	2	32.5 ± 3.5	-	31.3
20	23	12.6 ± 0.8	14	10.8 ± 0.5	10	11.6 ± 0.9	11.9 ± 1.0	0.0
25	31	7.0 ± 0.1	18	6.3 ± 0.4	4	6.2 ± 0.0	6.7 ± 0.4	5.0
30	40	4.9 ± 0.3	14	4.3 ± 0.3	8	4.3 ± 0.4	4.7 ± 0.4	1.5
35	25	5.1 ± 0.4	22	4.5 ± 0.5	4	5.0 ± 0.0	4.8 ± 0.8	11.6
19[a]	21	13.6 ± 0.6	32	12.2 ± 0.7	4	12.0 ± 0.1	12.7 ± 0.9	3.2
20.5[a]	29	10.7 ± 0.3	15	9.5 ± 0.4	5	9.6 ± 0.3	10.3 ± 0.6	0.0
23[a]	29	9.5 ± 0.5	25	8.5 ± 0.5	5	8.0 ± 0.6	8.9± 0.7	1.6
Greenhouse								
20,67[a]	30[b]						10.0 ± 0.6	0.0

[a] Mean fluctuating temperture
[b] Total number of pupae observed (males and females)

The percentage morta1ity of the pupae is highest at the extreme temperatures of 15 and 35°C and no mortality was recorded for the 20°C constant (Zenner-Polania, 1974)

Pupation takes place in a silken cocoon, in a rolled leaf. The pupal stage lasts on average 8.9 days at 32.2°C, 6.4 days at 26.7°C and 4.4 days at 21.1°C. (CABI, 2014)

Adult

The sub tropical origin and consequently the temperature for the highest reproduction of the OLR, which is approximately equal to the temperature range (15.5 - 24°c night-day) explains the excellent adaptation of this insect to greenhouse conditions, why it has become such an extab1ished pest, and why during the summer months the highest densities of the OLR are observed (Zenner-Polania, 1974)

The omnivorous leafroller has four to six generations per year in California, USA, depending on climatic conditions (UC-IPM, 2014); (CABI, 2014).

The minimum development threshold temperature is estimated to be 8.9ºC and the number of Celsius Degree-Days for development from egg to adult is 649 Degree-Days, according to Kido et al. model (UC-IPM 2014)

APPENDIX 6: HOSTS OF *Platynota stultana*

Host pest list: A list of **pests** that infest a **plant** species, globally or in an **area**. [CEPM, 1996; revised CEPM, 1999]
Pest: Any species, strain or biotype of plant, animal or **pathogenic** agent injurious to **plants** or **plant products**. [FAO, 1990; revised FAO, 1995; IPPC, 1997; revised CPM, 2012]
Highlited: 'preferred hosts`(see Q.2)

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Actinidia arguta (Siebold & Zucc.) Planch. ex Miq. (tara vine)	(Ericales: Actinidiaceae)	Other (CABI, 2014)			No
Actinidia deliciosa Liang et Ferguson, 1984 (kiwifruit)	(Ericales: Actinidiaceae)	**Main** (UC-IPM, 2014)	There are specific **Pest Management Guidelines** for this host in California. Omnivorous leafroller is the most common and damaging of the leafrolling caterpillars in kiwifruit. (UC-IPM, 2014)	Omnivorous leafroller and the other leafrolling caterpillars directly **damage fruit** by scarring the surface when they feed. Decisions to treat summer generations of the omnivorous leafroller should be based on the presence of caterpillars observed from periodic visual inspection of the vines, not from moths caught in traps (UC-IPM, 2014)	Yes
Albizia Durazz.	(Dicotyledonae: Fabales]	Wild host (CABI, 2014) Albizzia spp. (Brown et al., 2008) citing (Powell, 1983)	There are no specific Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Amaranthus L. (grain amaranth)	(Caryophyllales: Amaranthaceae)	Wild host (CABI, 2014) [(Brown et al., 2008) citing (Powell, 2006)=> California & (Miller et al., 1995) => Hawaiian Islands)]			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Ambrosia (Ragweed)	(Asterales: Asteraceae)	Wild host (CABI, 2014) ***Ambrosia dumosa*** (Brown et al., 2008) ***Ambrosia psilostachya*** (Brown et al., 2008)			No
Annona cherimola Mill (cherimoya)	(Annonales: Annonaceae)	Wild host (CABI, 2014)	There are no Pest Management Guidelines for cherimoya in California against *Platynota stultana* but there is a specific IPM program for "Leafrollers on Ornamental and Fruit Trees" that includes *P. stultana* (UC-IPM, 2014)		No
Apium graveolens L.(celery)	(Apiales: Apiaceae)	Other (CABI, 2014) (Brown et al., 2008)			No
Arachis	(Fabales: Fabaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)			No
Aster L.	(Asterales: Asteraceae)	Other (CABI, 2014) (Brown et al., 2008) citing Powell, 2006	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Atriplex halimus L. (Salado)	(Caryophyllales: Amaranthaceae)	Wild host (Junta de Andalucía, 2013)	The only detection reported: In 26/05/2011, when two *P Stultana* larves were detected in *Atriplex halimus.* The plant was placed next to a trap for *P.stultana.*		No
Atriplex calotheca (Rafn) Fr.	(Caryophyllales: Amaranthaceae)	(Brown et al., 2008) citing Powell 2006			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Baccharis pilularis DC.	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Beta vulgaris L.(beetroot)	(Caryophyllales: Chenopodiaceae)	Other (CABI, 2014) Occasional (UC-IPM, 2014) ***Beta sp.*** (Brown et al., 2008) citing (Powell, 1983)	There are Pest Management Guidelines for sugarbeet in California, but *P. stultana* or leafrollers are not included. However in peppers Cultural Control against *P. stultana* the following is stated "Avoid planting peppers near alfalfa or sugarbeet as these are good hosts" (UC-IPM, 2014)		No
Bidens laevis (L.) Britton et al.	(Asterales: Asteraceae)	(Brown et al., 2008) citing powell 2006			No
Capsicum annuum L. (bell pepper)	(Solanales: Solanaceae)	**Main** (CABI, 2014) Occasional (UC-IPM, 2014) (Junta de Andalucía, 2013) ***Capsicum sp.*** (Brown et al., 2008)	In Spain damage has been detected in leaves and fruit (Junta de Andalucía, 2013) There are specific **Pest Management Guidelines** for this host in California against *P. stultana*. Management: Treatments may occasionally be necessary.Cultural Control: Avoid planting peppers near alfalfa or sugarbeet as these are good hosts (UC-IPM, 2014)	The larvae build a nest by tying leaves together with silk webbing and remain inside this nest while feeding on the surface of the leaves. When leaves lie over a fruit, or if two fruit are touching, the larva will nest between the surfaces and feed on the fruit, causing substantial scarring. Larvae do not burrow into the fruit.(UC-IPM, 2014) In Spain, larvae produce damage mainly in leaves. Damage in frui has been observed in a lesser extend. It consist in a small single gallery from the stalk area to the inside of the fruit making galleries between the seeds, although sporadically (Junta de Andalucía, 2013)	Yes
Chenopodium album L.(fat hen)	Caryophyllales: Chenopodiaceae)	Other (CABI, 2014) ***Chenopodium sp.*** (Brown et al., 2008) citing (Powell, 1983)			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Chrysanthemum L.(daisy)	(Asterales: Asteraceae)	Other (CABI, 2014)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for *"Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Citharexylum spinosum L.	(Lamiales: Verbenaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)	There is no Pest Management Guideline for this host in California against *Platynota stultana* but there is a specific IPM program for *"Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Citrullus lanatus (Thunb.) Matsum & Nakai (watermelon)	(Violales: Cucurbitaceae)	Incidental (Fu Castillo et al., 2011)	In 2009 *P. stultana* was detected atacking melon, cucumber and watermelon in Costa de Hermosillo (Fu Castillo et al., 2011) No other reference has been found		No
Citrus L.	(Rutales: Rutaceae)	**Main** (CABI, 2014) (Kerns et al.2004) (UC-IPM, 2014) (Brown et al., 2008 ***Citrus limon*** ***Citrus sinensis*** (Brown et al., 2008)	The omnivorous leafroller is a frequent pest of citrus nurseries in Arizona, but rarely reach damaging levels on mature trees.(Kerns et al.2004). There are **specific Pest Management Guidelines** for this host in California. Omnivorous leafroller is only rarely a pest of citrus in the San Joaquin Valley and in interior and intermediate districts of southern California. (UC-IPM, 2014)	They tie leaves to fruit and feed under the buttons, leaving ring scarring similar to that of citrus thrips. In summer and fall, they tie leaves to ripening fruit and feed on the rind. (UC-IPM, 2014)	Yes
Conium maculatum L.	(Apiales: Apiaceae)	(Brown et al., 2008)			No
Convolvulus sp.	Convolvulaceae	(Brown et al., 2008)			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Conyza bilbaoana Remy.	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Cotoneaster Medik	(Rosales: Rosaceae)	Other (CABI, 2014)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Cucumis melo L. (melon)	(Violales: Cucurbitaceae)	Incidental (Fu Castillo et al., 2011)	In 2009 *P. stultana* was detected atacking melon, cucumber and watermelon in Costa de Hermosillo (Fu Castillo et al., 2011) No other reference has been found		No
Cucumis sativus L. (cucumber)	(Violales: Cucurbitaceae)	Incidental (Fu Castillo et al., 2011) (Junta de Andalucía, 2013)	In 2009 *P. stultana* was detected atacking melon, cucumber and watermelon in Costa de Hermosillo (Fu Castillo et al., 2011) In 2012 *P. stultana* was detected in cucumber in a greenhouse in the municipality of "El Ejido" (Almeria) and further captures have not been reported. (Junta de Andalucía, 2013) No other reference has been found		No
Cyclamen	(Primulales: Primulaceae)	Other (CABI, 2014), (Brown et al., 2008) citing (Powell, 1983)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there isa specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Dianthus caryophyllus L. (carnation)	(Caryophyllales: Caryophyllaceae)	Other (CABI, 2014) **Main** (Bohart, 1942) (Australia Government, 2006), (Brown et al., 2008 citing (Miller et al, 1995 ***Dianthus sp.*** (Brown et al., 2008) citing (Bohart, 1942)	In California is responsible for damage chiefly to carnation, rose and orange (Bohart 1942) "The HOSTS database of the World's lepidopteran hostplants (Robinson et al 2006) lists a large number of caterpillars that feed on *D. caryophyllus*" (Australia Government, 2006) HOSTS database of the World's lepidopteran hostplants (Robinson et al, 2012) There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)	Damage to carnation is of 3 types, leaf-tying, bud boring and stem boring in descending order of frequency (Bohart, 1942)	Yes
Dudleya virens (Rose) Moran	Crassulaceae	(Brown et al., 2008 citing LACM Index)			No
Epilobium brachycarpum K. Presl	Onagraceae	(Brown et al., 2008)			No
Ebenaceae	(Dicotyledonae: Ebenales)	Wild host (CABI, 2014)			No
Eriogonum grande	(Caryophyllales: Polygonaceae)	Wild host (Powell, 1980) ***Eriogonum latifolium Sm.*** (Brown et al., 2008) ***Eriogonum latifolium* subsp. grande (Greene) S. Stokes** (Brown et al., 2008) citing (Powell, 1983)	This species has been reared from *Eriogonum grande*, a native endemic plant, at Isthmus Station on Santa Catalina Island, by G. A. Gorelick, so it will be interesting to monitor its invasion of the native flora on Santa Cruz (Powell, 1980)		no

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Eucalyptus (Eucalyptus tree)	(Myrtales: Myrtaceae)	Other (CABI, 2014)			No
Gardenia	(Gentianales: Rubiaceae)	Other (CABI, 2014)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Ginkgo	(Ginkgoales: Ginkgoaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014).		No
Glycine max (soyabean)	(Fabales: Fabaceae)	Other (CABI, 2014) (Brown et al., 2008)			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Gossypium L. (cotton)	(Malvales: Malvaceae)	**Main** (CABI, 2014) (Atkins et al., 1957), (NVWA, 2012) Occasional (UC-IPM, 2014) ***Gossypium herbaceum* L.** (Brown et al., 2008)	*Platynota stultana*, all stages of which are described, caused widespread damage to cotton and lucerne in Imperial County, California, in 1954 (Atkins et al., 1957) *P. stultana* has at times been a serious pest of cotton at the Imperial Valley of California and part of Arizona and New Mexico (NVWA, 2012) There are **specific Pest Management Guidelines** for this host in California. Injury caused by these insects is sporadic, localized, and seldom of economic importance. Infestations are usually reduced by natural enemies. In Arizona, the suggested treatment threshold is when 25% of the plants have an active larva; California has not established a threshold. (UC-IPM, 2014).	Larvae feed on leaves, small squares, and on the surface of green bolls; injured bolls may open prematurely. (UC-IPM, 2014)	Yes
Grindelia camporum Greene	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Grindelia humilis Hook. & Arn.	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Juglans regia (walnut)	(Juglandales: Juglandaceae)	Other (CABI, 2014) ***Juglans sp.*** (Brown et al., 2008)			No
Juniperus (junipers)	(Pinales: Cupressaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)			No
Leucaena lanceolata S. Watson	(Fabales: Fabaceae	(Brown et al., 2008) (Miller et al., 1995)			No
Lotus scoparius	(Fabales: Fabaceae	(Brown et al., 2008)			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Malus domestica Borkh. (apple)	(Rosales: Rosaceae)	Occasional (UC-IPM, 2014)	There are **Pest Management Guidelines** for this host in California. Omnivorous leafrollers are more common in interior valleys and southern California mountain orchards, especially those next to vineyards, than in orchards in coastal areas or at higher elevations of the Sierra Foothills (UC-IPM, 2014)	Omnivorous leafroller larvae often web leaves into rolled protective shelters while feeding. They feed on leaves and on the surface of fruit, sometimes webbing one or more leaves to the fruit for protection. They chew shallow holes or grooves in the fruit surface, often near the stem end. The damage is similar to that caused by orange tortrix. Larvae feed where fruit are touching, so entire clusters can be damaged.(UC-IPM, 2014)	Yes
Malva (mallow)	(Malvales: Malvaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)			No
Medicago sativa L. (lucerne, alfalfa)	(Fabales: Fabaceae)	**Main** (CABI, 2014) (Atkins et al., 1957) Occasional (UC-IPM, 2014) (Brown et al., 2008)	*P. stultana*, all stages where they have been described, caused widespread damage to cotton and **lucerne** in Imperial County, California, in 1954. This pest damaged several thousand acres of seed alfalfa to the extent that it was necessary either to cut the alfalfa for hay or to abandon it. (Atkins et al., 1957) There are no Pest Management Guidelines for this host in California, but in peppers Cultural Control against *P. stultana*, the following is stated "Avoid planting peppers near alfalfa or sugarbeet **as these are good hosts**" (UC-IPM, 2014).	This pest damaged several thousand acres of seed alfalfa to the extent that it was necessary either to cut the alfalfa for hay or to abandon it. (Atkins et al., 1957). The only damage description found was reported in 1957 (Atkins et al., 1957). **No subsequent reports of damage have been found.**	Yes
Melilotus alba	(Fabales: Fabaceae	(Brown et al., 2008)			No
Melilotus alba/indica	(Fabales: Fabaceae	(Brown et al., 2008)			No
Mentha (mints)	(Lamiales: Lamiaceae)	Other (CABI, 2014)			No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Ocimum basilicum L. (basil)	(Lamiales: Lamiaceae)	Incidental (Junta de Andalucía, 2013)	*P. stultana* larvae have been observed in basil inside a greenhouse. (Junta de Andalucía, 2013) Nevertheless, basil compounds seems to have repellent properties against several Lepidopterans (Shadia et al, 2007), (Kostic et al, 2008), (Pavela, 2004)	--	No
Parkinsonia aculeata L. (Mexican palo-verde)	(Fabales: Fabaceae)	Incidental (Brown et al., 2011)	Rolled leaves of *Parkinsonia aculeata* harboring larvae of *Platynota stultana* were collected at several sites in a large swamp known as Laguna Ajinche near the town of Ebano, San Luis Potosí, Mexico, on 10 November 2006. (Brown et al., 2011)		No
Parthenium hysterophorus L.	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Pelargonium (pelargoniums)	(Geraniales: Geraniaceae)	Other (CABI, 2014)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Persea americana (avocado)	(Laurales: Lauraceae)	Other (CABI, 2014) Occasional (Gilligan & Epstein, 2012 (Brown et al., 2008) citing (Powell, 1983)	This species is considered a pest in greenhouses and vineyards, but it also attacks row crops, citrus, and occasionally avocado. Powell, 1983 is cited as reference to substantiate this. (Gilligan & Epstein, 2012 There are specific Pest Management Guidelines for avocado in California but P. stultana is not included. However, there is a specific IPM program for "Leafrollers on Ornamental and Fruit Trees" that includes *P. stultana* (UC-IPM, 2014)		No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Phaseolus vulgaris L. (common bean)	(Fabales: Fabaceae)	Other- Phaseolus (beans) (CABI, 2014 Incidental (Junta de Andalucía, 2013) ***Phaseolus sp.*** (Brown et al., 2008) citing (Powell, 1983)	In 28/10/2011, it was the first detection of *P. stultana* in Common bean, but it was not detected again after then. (Junta de Andalucía, 2013)		No
Pinus sp. (pine)	[Pinaceae: Pinus]	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)			No
*Poaceae (*grasses) *[Gramineae]*	[Cyperales: Poaceae]	Other (CABI, 2014)			No
Portulaca grandiflora (Rose moss)	(Caryophyllales: Portulacaceae)	Other (CABI, 2014) ***Portulaca oleracea*** (Brown et al., 2008 citing Powell 2006)) ***Portulaca sp.*** (Brown et al., 2008) citing (Powell, 1983)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there isa specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Prunus domestica L. (plum)	(Rosales:Rosaceae)	Minor (LaRue et al, 1989) (UC-IPM, 2014)	All stone fruits have been reported as host but it is primarily a pest of nectarine and peach in the San Joaquin Valley. (LaRue et al, 1989) There are specific **Pest Management Guidelines** for this host against P. stultana in California. It is a pest of plums primarily in the San Joaquin Valley. It occurs in the Sacramento Valley but seldom causes damage. (UC-IPM, 2014)	Omnivorous leafroller larvae often web leaves into rolled, protective shelters while feeding. They feed on leaves and on the surface of fruit, sometimes webbing one or more leaves to the fruit for protection. They chew shallow holes or grooves in the fruit surface, often near the stem end. Primary damage results from fruit feeding. Young fruit may be destroyed, and scars on older fruit will cause them to be culled or downgraded at harvest. Feeding injury also may increase the incidence of brown rot and other fruit decays. (UC-IPM, 2014).	Yes

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Prunus persica (L.) Batsch (peach)	(Rosales: Rosaceae)	**Main** (CABI, 2014), (LaRue et al, 1989), (UC-IPM, 2014)	All stone fruits have been reported as host but it is primarily a pest of nectarine and peach in the San Joaquin Valley. There are specific **Pest Management Guidelines** for this host against *P. stultana* in California. Omnivorous leafroller is primarily a pest of peaches in the San Joaquin Valley. It occurs in the Sacramento Valley but seldom causes damage. (UC-IPM, 2014)	Omnivorous leafroller larvae often web leaves into rolled protective shelters while feeding. They feed on leaves and on the surface of fruit, sometimes webbing one or more leaves to the fruit for protection. They chew shallow holes or grooves in the fruit surface, often near the stem end, and webbing is usually present on fruit. Damage results from fruit feeding. Young fruit may be destroyed, and scars on older fruit will cause them to be culled or downgraded at harvest. Feeding injury also may increase the incidence of brown rot and other fruit decays. (UC-IPM, 2014)	Yes
Punica granatum L. (pomegranate)	(Myrtales: Punicaceae)	**Main** (CABI, 2014) (Carroll, 2013) (Brown et al., 2008)	There are specific **Pest Management Guidelines** for this host against *P. stultana* in California.(UC-IPM, 2014) Usually, even if no control measures are taken, only a low number of fruit will be damaged, but in some locations damage may reach 20% or more. Even a 1-2% loss is worth taking control measures. (Carroll, 2013)	On pomegranates, the caterpillars typically carve surface grooves where two fruit touch, or where the caterpillar has tied a leaf to the fruit surface. Sometimes the caterpillar will tunnel into the fruit. If skin penetration has occurred, even small openings, pathogens become established internally and grow on the arils. If the fruit is not culled before juicing, the product may be ruined.(Carroll, 2013)	Yes
Pyrus L. (pears)	(Rosales: Rosaceae)	**Main** (CABI, 2014) Minor (UC-IPM, 2014)	There are specific **Pest Management Guidelines** for this host against *P. stultana* in California. Omnivorous leafrollers are more common in interior valleys and southern California mountain orchards, especially those next to vineyards, than in orchards in coastal areas or at higher elevations of the Sierra Foothills. Omnivorous leafrollers commonly develop on host plants outside the orchard and adults may migrate from host plants outside the orchards. It is a minor pest in pear orchards (UC-IPM, 2014)	Infestations are often spotty, making monitoring difficult. Omnivorous leafroller feeds on both fruit and foliage. When larvae feed on fruit, they cause irregular, shallow scars similar to those caused by orange tortrix. Larvae feed where fruit are touching, so entire clusters frequently are damaged. (UC-IPM, 2014)	Yes

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Ribes L..(currants)	(Cunoniales: Grossulariaceae)	Other (CABI, 2014)			No
Rosa L. (roses)	(Rosales: Rosaceae)	Other (CABI, 2014) **Main** (Bohart, 1942); (United States: Bureau of Ent,1933), (Brown et al., 2008)	In California is responsible for damage chiefly to carnation, rose and orange (Bohart, 1942) In 1933 serious damage was reported from a large commercial rose-growing plant in northern Virginia. (United States: Bureau of Ent,1933)	The larvae draw two leaves together, or fold over the edges of individual leaves, usually severing the petioles of the leaflet and causing it to die. Some feeding takes place on the inner side of the folded leaf; also flower buds are sometimes eaten into on the side and tender growths are cut off. (United States: Bureau of Ent,1933)	Yes
Rubus L. (Caneberry: blackberry, raspberry)	(Rosales: Rosaceae)	Other (CABI, 2014) **Main** (UC-IPM, 2014) (Brown et al., 2008) citing (Powell, 1983)	There are specific **Pest Management Guidelines** for this host against leafrollers (including *P. stultana)* in California. Four leafrollers in the family Tortricidae, apple pandemis, light brown apple moth, omnivorous leafroller, and orange tortrix, are pests of caneberries. Omnivorous leafroller is a pest of blackberries and raspberries primarily in the Central Valley. (UC-IPM, 2014)	Leafroller larvae feed on fruit and foliage. Foliar injury is generally minor; the primary problem caused by leafrollers is that they get into and contaminate fruit.(UC-IPM, 2014)	Yes
Rumex crispus	Polygonaceae	(Brown et al., 2008)			No
Salix lasiolepis (ID uncertain)	Salicaceae	(Brown et al., 2008)			No
Salsola kali	Chenopodiaceae	(Brown et al., 2008)			No
Senecio (Groundsel)	(Asterales: Asteraceae)	Wild host (CABI, 2014) ***Senecio jacobaea*** *L* (Frick & Hawkes, 1970)			No
Sida acuta Burm. f.	(Malvales: Malvaceae)	(Brown et al., 2008)	*Platynota* poss. *stultana*		No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Solanum lycopersicum L. (tomato)	(Solanales: Solanaceae)	Other (CABI, 2014) Incidental ***Lycopersicon esculentum* Mill.** (Powell, 1980)	"The earliest record in California I have seen is at La Mirada, Los Angeles County, where it was reared from tomato in 1898 (specimen, NMNH)" (Powell, 1980) No other reports have been found.	---	No
Solanum melongena L. (aubergine)	(Solanales: Solanaceae)	Incidental (Junta de Andalucía, 2013)	The only detection reported: 26/05/2010 when the first detection of *Platynota stultana* in auberbgine was reported by the Plant Production and Protection Laboratory. (Junta de Andalucía, 2013) No other reports have been found	--	No
Solidago californica	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Sorghum bicolor (L.) Moench (sorghum)	(Cyperales: Poaceae)	Other (CABI, 2014) ***Sorghum sp.*** (Brown et al., 2008) citing (Powell, 1983)			No
Taxus L. (yew)	(Pinales: Taxaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No

Scientific name (common name)	Taxonomy	Type of host [References]		Damage reported	Considered 'preferred host' (see Pest overview section)
Theaceae D. Don	(Theales: Theaceae)	Other (CABI, 2014)	There are no Pest Management Guidelines for this host in California against *Platynota stultana* but there is a specific IPM program for "*Floriculture and Ornamental Nurseries-Leafrollers*" that includes *P. stultana* (UC-IPM, 2014)		No
Trifolium (clovers)	(Fabales: Fabaceae)	Other (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983)			No
Vigna unguiculata (L.) Walp (cowpea)	(Fabales: Fabaceae)	Other (CABI, 2014)			No
Vitis vinifera L. (grapevine)	(Rhamnales: Vitaceae)	**Main** (CABI, 2014) (UC-IPM, 2014) (Brown et al., 2008) ***Vitis sp.*** (Brown et al., 2008)	There are specific **Pest Management Guidelines** for this host in California. The omnivorous leafroller can cause serious damage in California's Central Valley and inner coastal vineyards (UC-IPM, 2014)	Although it does feed on leaves, flowers, and developing berries, the most significant damage occurs after veraison when feeding allows rot organisms to enter fruit at the damage sites. (UC-IPM, 2014)	Yes
Wyethia angustifolia	(Asterales: Asteraceae)	(Brown et al., 2008)			No
Zea mays L. (maize)	(Cyperales: Poaceae)	**Main** (CABI, 2014) (Brown et al., 2008) citing (Powell, 1983) Unclassified (EPPO, 2014)	[Brown et al, 2008] links to [Powell, 1983]	All the references founded cite **(Powell, 1983).** **No subsequent reports of damage have been founded.**	Yes

APPENDIX 7: CATEGORIZATION OF HOSTS FOR PATHWAY ANALYSIS

- **Plants for planting as seeds, bulbs and tubers, and plant products as grain are <u>not</u> forms liable to carry the pest. Thus, they are not pathways for entry of *P.stultana*.**

- *P. stultana* is a highly polyphagous species. Secondary hosts of the pest include species which are widely regarded as **weeds**, as well as **species that are endemic to Mexico and Southern U.S.A**. but do not have any relevant use. **International trade of these species is highly unlikely and thus will not be considered as a pathway of entry for the pest.** The following tables show those species within *P. stultana* host range which are included in the list of 'Weeds of the U.S.' and those which, according to the GRIN Database, has no economic importance.

Table 9.1. Hosts of *P. stultana* included in the list of Weeds of the U.S. (source: plants.usda.gov)
International trade unlikely, thus not considered as a pathway of entry for the pest.

Species	Comments
Ambrosia psilostachya DC. (Cuman ragweed) Family: Asteraceae	*A. psilostachya* is included in the list of Weeds of the U.S.
Chenopodium L. (goosefoots) -- *Chenopodium album* L. (lambsquarters) Family: Chenopodiaceae	The genus *Chenopodium* contains several plants of minor importance as food crops (leaf vegetables and pseudocereals) as well as many significant weeds. *Chenopodium album* is included in the list of Weeds of the U.S.
Citharexylum spinosum L. (spiny fiddlewood) Family: Verbenaceae	*C. spinosum* is included in the list of Weeds of the U.S.
Conium maculatum L. (poison hemlock) Family: Apiaceae	*C. maculatum* is considered a noxious weed in several U.S. states; it is also included in the list of Weeds of the U.S.
Convolvulus L. (bindweed) Family: Convolvulaceae	Many of the bindweeds are problematic weeds, but some are also cultivated for ornamental purposes (e.g. see Category 2: Floriculture crops and ornamental trees). *Convolvulus arvensis* L. is considered a noxious weed in 22 U.S. states, including California, Arizona, Hawaii and Texas.
Parthenium hysterophorus L. (Santa Maria feverfew) Family: Asteraceae	*Parthenium hysterophorus* is included in the list of Weeds of the U.S.
Portulaca L. (purslane) -- *Portulaca oleracea* L. (little hogweed) Family: Portulacaceae	The genus *Portulaca* contains a species that are considered edible plants, ornamental plants (e.g. *Portulaca grandiflora*, see Category 2 Floriculture crops and ornamental trees) or even used as fodder. *P. oleracea* is considered a noxious weed in Arizona and included in the list of Weeds of the U.S.
Rumex crispus L. (curly dock) Family: Polygonaceae	*R. crispus* is considered a noxious weed in several U.S. states; it is also included in the list of Weeds of the U.S.
Salsola kali L. (Russian thistle) Family: Chenopodiaceae	*S. kali* is considered a noxious weed in several U.S. states, including Hawaii; it is also included in the list of Weeds of the U.S.
Senecio L. (ragwort) -- *Senecio jacobea* L. (stinking willie) (=*Jacobaea vulgaris* Gaertn.) Family: Asteraceae	The genus *Senecio* contains five species listed as Weeds of the U.S. *S. jacobea* is considered a noxious weed in nine U.S. states, including Arizona and California; it is also included in the list of Weeds of the U.S.
Vigna unguiculata (L.) Walp.(cowpea) Family: Fabaceae	*V. unguiculata* is included in the list of Weeds of the U.S.

Table 9.2. Hosts of *Platynota stultana* without relevant economic importance (source: www.ars-grin.gov)
International trade unlikely, thus not considered as a pathway of entry for the pest.

Species	Comments
Ambrosia dumosa (A. Gray) W. W. Payne (burrobush) Family: Asteraceae	Although *A. dumosa* can be used for erosion control, as revegetator and even as fodder crop, its economic importance seems restricted to its native area (Southwestern U.S.A. and Northern Mexico).
Atriplex halimus L. (Mediterranean saltbush) Family: Chenopodiaceae	Although *Atriplex halimus* is an edible plant and may be used for decorative purposes, it is an endemic Mediterranean species without economic importance in Spain –where *P. stultana* has been recorded–.
Atriplex calotheca (Rafn) Fr. (halberdleaf orach) Family: Chenopodiaceae	*A. calotheca* has no known use or relevant economic importance.
Baccharis pilularis DC. (coyotebrush) Family: Asteraceae	*B. pilularis* has no current economic importance. Native Americans formerly used the infusion of the plant as general remedy and its wood for arrows.
Bidens laevis (L.) B. S. P. (smooth beggartick) Family: Asteraceae	No known use.
Conyza bilbaoana Remy. Family: Asteraceae	No known use.
Dudleya virens (Rose) Moran (bright green dudleya) Family: Crassulaceae	It is an uncommon species, native to southern California.
Epilobium brachycarpum C. Presl (panicle willowherb) Family: Onagraceae	Formerly, the infusion of plant tops applied to the hair as a conditioner for dandruff and hair manageability.
Eriogonum grande Greene Family: Polgonaceae	No known use.
Eriogonum latifolium Sm. (coast-buckwheat) Family: Polgonaceae	Formerly used by Native Americans as medicine.
Grindelia camporum Greene (Great Valley gumweed)	This plant, native to California, has a number of historical medicinal uses and potential as fodder, but currently lacks of economic importance.

Species	Comments
Family: Asteraceae	
Grindelia humilis Hook. & Arn. (=*Grindelia hirsutula* Hook. & Arn.) (hairy gumweed) Family: Asteraceae	Only medicinal use in folklore.
Leucaena lanceolata S. Watson Family: Fabaceae	No known use.
Lotus scoparius (Nutt.) Ottley (California-broom) Family: Fabaceae	Formerly used by Native Americans as medicine, building material, food, fodder or soap.
Sida acuta Burm. f. (common wireweed) Family: Malvaceae	Only medicinal use in folklore, it is even considered a weed in some areas.
Solidago velutina DC. subsp. *californica* (Nutt.) Semple (=*Solidago californica* Nutt.) (California goldenrod) Family: Asteraceae	Formerly used by Native Americans as remedy.
Wyethia angustifolia (DC.) Nutt. (California compassplant) Family: Asteraceae	Formerly used by Native Americans as food or medicine.

- The list of hosts of *P. stultana* also includes several species that, despite their economic importance, are **very unlikely to be traded to Europe as plant parts liable to carry the pest.** For example, grain legumes such as soybean, independently of their intended use (propagation or human/animal food), are typically traded as seeds. This is also the case of cereals such as sorghum or corn, grasses used for lawns or turfs, forage or fodder crops such as alfalfa or clovers and also fiber crops such as cotton. **Given that seeds or grains are not a pathway of entry of *P. stultana*, these species will not be considered further in the analysis.**

Table 9.3. Hosts of *P. stultana* commonly only traded as plant parts that are not liable to carry the pest.
Thus, not considered as a pathway of entry for the pest

Type of crop	Species
Pulses (grain legumes)	*Arachis* L. (peanut) *Glycine max* (L.) Merr (soybean)
Fiber crops	*Gossypium* L. (cotton) -- *Gossypium herbaceum* L. (Levant cotton)
Forage or fodder crops	*Medicago sativa* L. (alfalfa) *Melilotus albus* Medik. (sweetclover) *Melilotus indicus* (L.) All. (annual yellow sweetclover) *Trifolium* L. (clover)
Cereals or lawn/turf	*Amaranthus* spp. (Grain amaranth) *Poaceae Barnhart* (true grasses) *Sorghum* Moench (sorghum genus) *Sorghum bicolor* (L.) Moench (sorghum) *Zea mays* L. (corn)

- The rest of hosts of *P. stultana*, which are known to be cultivated for a certain use and may be traded at least in a form liable to carry the pest, have been grouped in one of these three broad categories:
  (1) Fruit trees;
  (2) Floriculture crops & Ornamental trees; or
  (3) Vegetable crops, as shown in **Table 9.4.**

Certain hosts of *P. stultana* are highlighted and shown in the text in bold. These hosts are considered as '**preferred'** by the PRA assessors and thus **expected to pose a higher risk of pest introduction than the rest of hosts**, considered as 'secondary'. The criteria for this distinction were mentioned in "Host plants" (Question 2)

Table 9.4: Categories of hosts of *P. stultana* used for the analysis of pathways

Category 1	**Fruit trees** Traded forms of fruit trees liable to carry the pest include: i. **Plants for planting** (except seeds, bulbs and tubers) with or without soil attached ii. **Fruits** for fresh consumption iii. **Cut branches with foliage** for ornamental purposes	Includes trees that bear fruits that are used for human food: *Actinidia arguta* (Siebold & Zucc.) Planch. ex Miq. (tara vine) -- ***Actinidia deliciosa* (A. Chev.) C. F. Liang & A. R. Ferguson (kiwi)** *Annona cherimola* Mill. (cherimoya) ***Citrus* L. (citrus)** -- *Citrus limon* (L.) Burm. f. (lemon) -- *Citrus maxima* (Burm.) Merr. (pummelo) -- *Citrus reticulata* Blanco (mandarin) -- *Citrus sinensis* (L.) Osbeck (sweet orange) Ebenaceae Gürke (ebony family) *Juglans* L. (walnut) --*Juglans regia* L. (English walnut) ***Malus domestica* Borkh. (apple)** *Persea americana* Mill. (avocado) ***Prunus domestica* L. (plum)** ***Prunus persica* (L.) Batsch (peach)** ***Punica granatum* L. (pomegranate)**

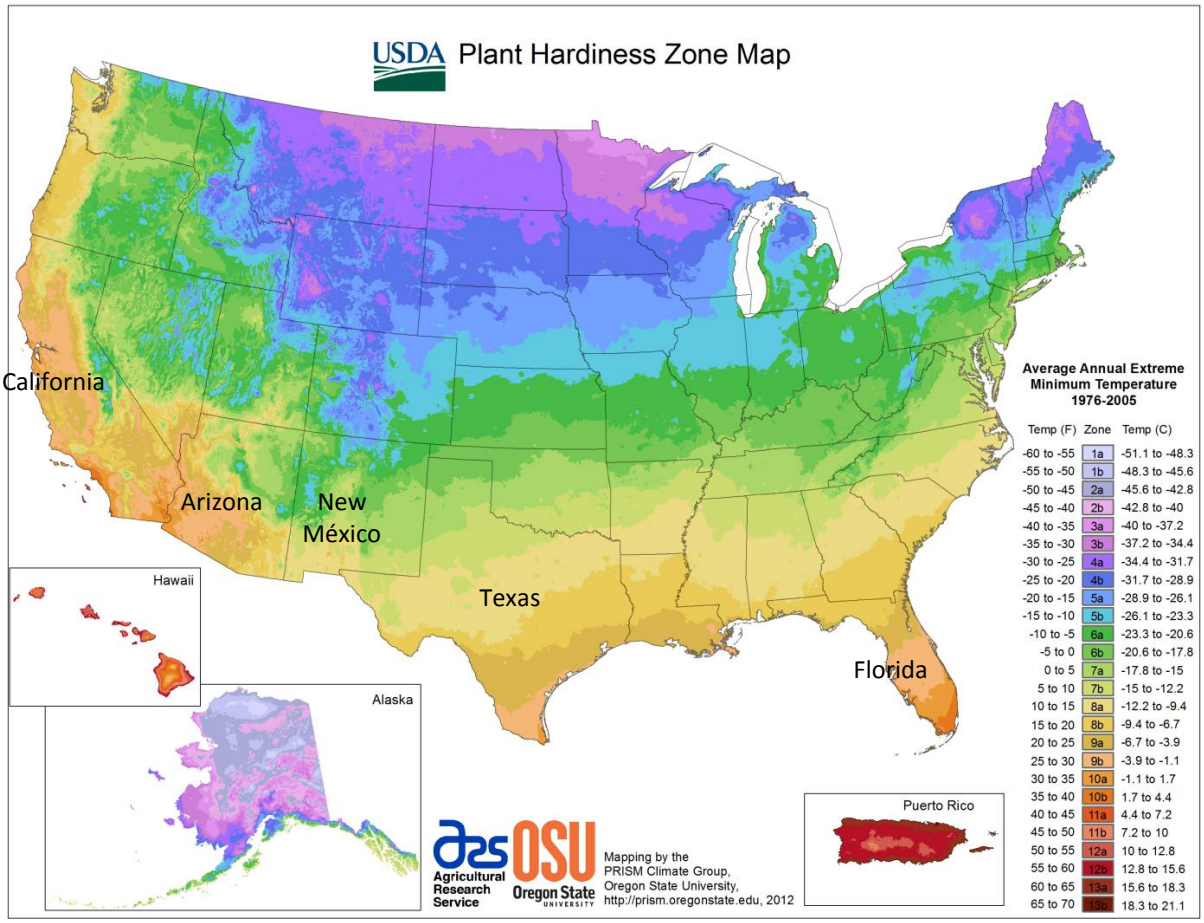
		***Pyrus* L. (pear)** *Ribes* L. (currant) ***Rubus* L. (blackberry** and **raspberry)** *Vitis* L. (grape) **-- *Vitis vinifera* L. (vine grape)**
Category 2	**Floriculture crops & Ornamental trees** Traded forms of floriculture crops & ornamental trees liable to carry the pest include: i. **Plants for planting** (except seeds, bulbs and tubers) with or without soil attached ii. **Cut flowers or branches with foliage** for ornamental purposes	Includes bedding and garden plants, foliage plants, potted flowering plants, cut flowers, cut cultivated greens and trees used as part of a garden or landscape setting: *Albizia* Durazz. (albizia) *Aster* L. (aster) *Chrysanthemum* L. (daisy) (=*Dendranthema)* *Convolvulus* L. (bindweed) *Cotoneaster* Medik. (cotoneaster) *Cyclamen* L. (cyclamen) *Dianthus* L. (pink) **-- *Dianthus caryophyllus* L. (carnation)** *Eucalyptus* L'Her. (gum) *Gardenia* J. Ellis (gardenia) *Ginkgo biloba* L. (maidenhair tree) *Juniperus* L. (juniper) *Malva* L. (mallow) *Parkinsonia aculeata* L. (Jerusalem thorn) *Pelargonium* L'Hér.ex Aiton (geranium) *Pinus* L. (pine) *Portulaca grandiflora* Hook. (rose moss) ***Rosa* L. (rose)** *Salix lasiolepis* Benth. (arroyo willow) *Taxus* L. (yew) Theaceae D. Don (Tea family)
Category 3	**Vegetables** Traded forms of vegetable crops liable to carry the pest include: i. **Plants for planting** (except seeds, bulbs and tubers) with or without soil attached ii. **Fruits, stems, leaves or flower plant parts** for fresh consumption	Includes plants whose fruit, seed, roots, tubers, bulbs, stems, leaves or flower plant parts are used for human food: *Apium graveolens* L. (celery) *Beta* L. (beet) *Beta vulgaris* L. (common beet) *Capsicum* L. (pepper) **-- *Capsicum annuum* L. (bell pepper)** *Citrullus lanatus* (Thunb.) Matsum. & Nakai (watermelon) *Cucumis melo* L. (melon) *Cucumis sativus* L. (cucumber) *Mentha* L. (mint) *Ocimum basilicum* L. (sweet basil) *Phaseolus* L. (bean) *--Phaseolus vulgaris* L. (common bean) *Lycopersicon esculentum* Mill. (=*Solanum lycopersicum* L. var. *lycopersicum*) (tomato) *Solanum melongena* L. (eggplant)

- In Spain, damage by *P. stultana* has exclusively been reported on *Capsicum annuum* L. (pepper). Consequently, ***Capsicum annuum* L. is considered as the only preferred host in Spain** and trade within the European Union will be focused in traded forms of pepper liable to carry the pest.

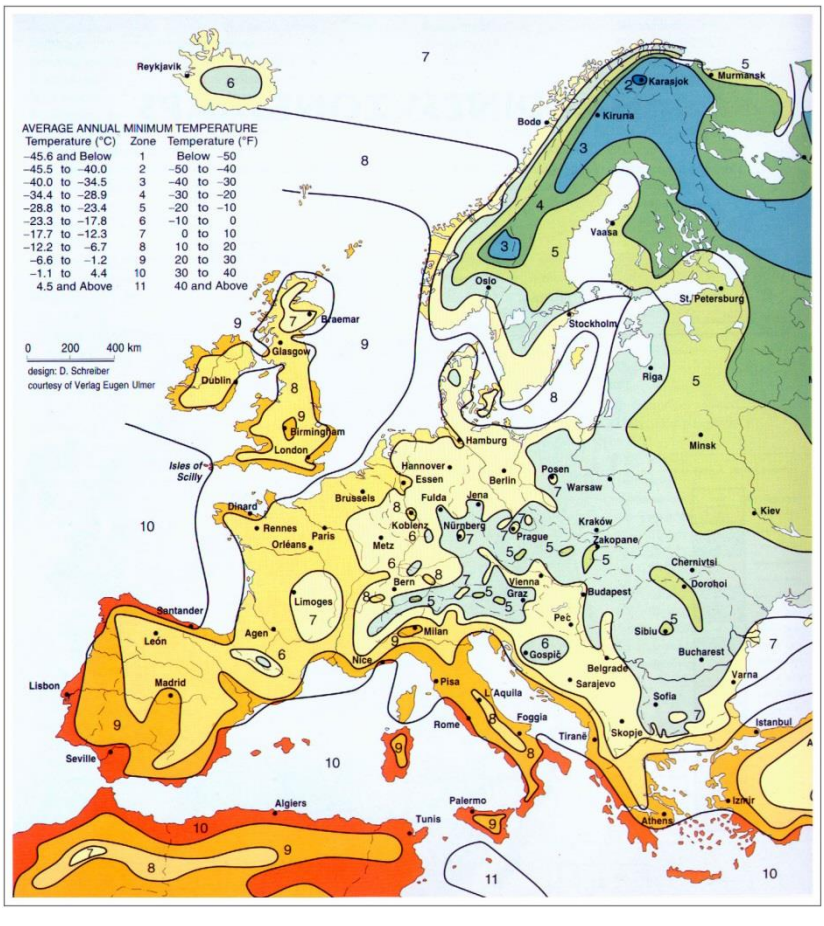
For the purpose of the risk assessment, **the more suitable a plant is as a host (feeding and successful nymphal development), the higher the risk it presents as a commodity.**

APPENDIX 8: PLANT HARDINESS MAP ZONE

Extreme minimum temperature:



Map 1. **United States plant hardiness zone map**
http://planthardiness.ars.usda.gov/PHZMWeb/



Map 2. **Europe plant hardiness zone map**

http://www.sequimrareplants.com/picture%20gallery/European%20Hardiness%20Zone%20Map.html

APPENDIX 9: DISTRIBUTION OF HOSTS of *Platynota stultana* IN THE PRA AREA

Highlighted: 'preferred hosts'(see Q.2)

Host Scientific name (common name) / habitats*	**Presence in PRA area (Yes/No)**	**Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)**
Actinidia arguta (Siebold & Zucc.) Planch. ex Miq. (tara vine)	Yes	It is native to East Asia and it is currently cultivated as a minor crop in countries like Italy, Russia, Japan, China, Canada, France, New Zealand and the United States
Actinidia deliciosa Liang et Ferguson, 1984 (kiwifruit)	Yes	Minor crop in Italy, Greece, France, Portugal, Spain covering an area of about 40.000 ha (FAOSTAT, 2013) - DATA 2011
Albizia Duraz.	Yes	It is widely planted as an **ornamental plant** in parks and gardens
Amaranthus L. (grain amaranth)	Yes	Minor crop in some countries such Austria and Poland (Berghofer & Schoenlechner, 2002)
Ambrosia (Ragweed)	Yes	**Weed specie** in soya-bean and sunflower fields widespread in Eastern and Central Europe
Annona cherimola Mill (cherimoya)	Yes	Minor crop in Italy, Madeira (Portugal), Spain (CABI, 2014)
Apium graveolens L.(celery)	Yes	Major crop, widespread, widely cultivated for fruit in the UE
Arachis	Yes	Wild specie recorder around the world [Región de Murcia, 2013] Groundnut (*Arachis hypogaea*) it is mainly cultivated in Bulgary with 10.000 ha and in a lesser extent in Greece, Spain, Portugal and Hungary (FAOSTAT, 2013) - DATA 2011
Aster L.	Yes	Widely spread. In all the UE countries, there is an *Aster* specie such as *Aster alpinus* L., *Aster amellus* L., *Aster bellidiastrum* (L.) Scop., *Aster laevis* L., *Aster lanceolatus* Willd, *Aster linosyris* (L.) Bernh. (Flora europaea, 2011)
Atriplex halimus L. (Salado)	Yes	Wild specie South Europe (France, Greece, Italy, Portugal, Spain) (Flora europaea, 2011)
Beta vulgaris L..(beetroot)	Yes	Major crop, widespread, widely cultivated for fruit in the UE
Capsicum annuum L. (bell pepper)	Yes	Major crop, widespread, widely cultivated for fruit as chillies and peppers in the UE

Host Scientific name (common name) / habitats*	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)
Chenopodium album L.(fat hen)	Yes	Wild specie Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Fance (Corse), Finland, France, Germany, Greece, Hungary, Ireland, Italy, , Netherlands, Poland, Portugal, Romania, Spain, Sweden, United Kingdom, Yugoslavia (former) (Flora europaea, 2011)
Chrysanthemum L.(daisy)	Yes	*Chrysanthemum coronarium* L. is in the PRA area (Austria, Czechoslovakia, France, Greece, Italy, Portugal, Romania, Spain, Yugoslavia) (Flora europaea, 2011)
Citharexylum spinosum L.	Yes, as ornamental plant	Ornamental plant native to southern Florida in the United States, the Caribbean, Guyana, Suriname, and Venezuela
Citrullus lanatus (Thunb.) Matsum & Nakai (watermelon)	Yes	Widely grown for fruit in Southern Countries
Citrus L.	Yes	Spread over large areas in Southern European Countries, almost 500.000 ha according to FAO data. It is located in Croatia, Cyprus, Denmark, France, Greece, Italy, Malta, Portugal, Spain and Yugoslavia (former) (FAOSTAT, 2013)- DATA 2011
Cotoneaster Medik	Yes	Ornamental plant native to the Palaearctic region (temperate Asia, Europe, north Africa),
Cucumis melo L. (melon)	Yes	Widely grown in Southern Countries, in more than 85.000 ha according to FAO data. It is located in Austria, Cyprus, Czech Republic, Denmark, France, Greece, Hungary, Italy, Malta, Netherlands, Portugal, Romania, Slovakia, Spain (FAOSTAT, 2013)- DATA 2011
Cucumis sativus L. (cucumber)	Yes	Major crop, widely cultivated for fruit as Cucumbers & gherkins in the UE. According to FAO data the surface is nearly 60.000 ha located in Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom (FAOSTAT, 2013)- DATA 2011
Cyclamen	Yes	*Cyclamen* is an ornamental herbaceous plant native to Eastern Mediterranean
Dianthus caryophyllus L. (carnation)	Yes	Commercial cut flower, which are mostly grown in protected conditions

Host Scientific name (common name) / habitats*	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)
Ebenaceae	Yes	According to Flora europaea, 2011 *Diospyros lotus* is present in France, Greece, Italy, Spain and Yugoslavia. Oriental persimmon cultivars are mainly grafted onto *Diospyros kaki*, *Diospyros lotus* and Oriental persimmon cultivars are grafted onto *Diospyros kaki*, *Diospyros lotus* and *Diospoyros virginiana* rootstocks. Persimmon its cultivated in France, Greece, Italy, Portugal, Romania, Slovenia, Spain (CABI, 2014)
Eriogonum grande	Yes	*Eriogonum grande* is a species of wild buckwheat that is seen rather often in European gardens. Buckwheat is cultivated for its seeds and also used as a cover crop. In Europe it is cultivated in Poland, France, Lithuania, Latvia, Slovenia, Czech Republic, Hungary, Slovakia, Estonia and Croatia covering nearly 150.000 ha (FAOSTAT, 2013)- DATA 2011
Eucalyptus (Eucalyptus tree)	Yes	According to Flora europaea, 2011 it is distributed in the PRA area
Gardenia	Yes	Ornamental plant
Ginkgo	Yes	Ornamental plant
Glycine max (soyabean)	Yes	Major crop, widely cultivated in the PRA area. According to FAO data the surface is nearly 500.000 ha located in ustria, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Poland, Romania, Slovakia, Slovenia and Spain (FAOSTAT, 2013)- DATA 2011
Gossypium L. (cotton)	Yes	It is mainly cultivated in Greece, Spain covering an area of about 370.000 ha (FAOSTAT, 2013)- DATA 2011
Juglans regia (walnut)	Yes	It is cultivated in Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, France, Germany, Greece, Hungary, Italy, Luxembourg, Poland, Portugal, Romania, Slovakia, Slovenia, Spain with more than 100.000 ha (FAOSTAT, 2013)- DATA 2011
Juniperus (junipers)	Yes	Throughout Europe (Flora europaea, 2011)

Host Scientific name (common name) / habitats*	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)
Malus domestica Borkh. (apple)	Yes	Widely distributed in the PRA area, mainly in Portugal, Lithuania, Greece, United Kingdom, Spain, Germany, Hungary, France, Romania, Italy and Poland, covering an area of nearly 550. 000 ha, and to a lesser extent in t is located in Malta, Luxembourg, Finland, Sweden, Denmark, Ireland, Slovakia, Slovenia, Estonia, Latvia, Bulgaria, and Austria (FAOSTAT, 2013)-DATA 2011
Malva (mallow)	Yes	*Malva alcea* L. is present in Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Estonia, Latvia, Lithuania, Finland, France, Germany, Hungary, Italy, Netherlands, Poland, Romania, Spain, Sweden, Yugoslavia (Flora europaea, 2011)
Medicago sativa L. (lucerne, alfalfa)	Yes	It is cultivated along the PRA area, in Italy, Romania, Spain, Hungary, Bulgaria, Czech Republic, Slovakia, Poland, Croatia, Austria, Estonia, Netherlands, Lithuania and Denmark covering more than 1.500.000 ha (EUROSTAT, 2013); DATA 2009
Mentha (mints)	Yes	*Mentha piperita* (Peppermint) is a minor crop in Spain and Bulgaria covering an area of 200 ha (FAOSTAT, 2013)- DATA 2011 Wild specie found throughout Europe, in moist situations
Ocimum basilicum L. (basil)	Yes	Present in the PRA area. It is very sensitive to cold, thats why in Northern Europ it grow best under protected conditions
Parkinsonia aculeata L. (Mexican palo-verde)	Yes	It is planted as an ornamental plant in gardens
Pelargonium (pelargoniums)	Yes, as ornamental plants	Some species of pelargonium are present (Flora europaea, 2011)
Persea americana (avocado)	Yes	It is grown in Spain and Portugal covering more than 20.000 ha and in a lesser extent in Greece with 400 ha (FAOSTAT, 2013)- DATA 2011
Phaseolus vulgaris L. (common bean)	Yes	Major crop in the PRA area grown as dry &green beans covering nearly 140.000 ha in Germany, Portugal, Netherlands, France, Belgium, Greece, Spain, Poland, Italy and Romania (FAOSTAT, 2013)- DATA 2011
Pinus sp. (pine)	Yes	Widely present in the PRA area

Host Scientific name (common name) / habitats*	**Presence in PRA area (Yes/No)**	**Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)**
Poaceae (grasses) *[Gramineae]*	Yes	Widely present in the PRA area (Flora europaea, 2011)
Portulaca grandiflora (Rose moss)	Yes, as ornamental plant	Occasionally established in S. and S.C. Europe (Flora europaea, 2011)
Prunus domestica L. (plum)	Yes	Widely distributed in the PRA area as plums and sloes covering nearly 190.000 ha in Romania, Poland, France, Spain, Bulgaria, Italy, Hungary, Croatia, Austria, Germany, Slovenia, Slovakia, Czech Republic, Portugal, Greece and Lithuania (FAOSTAT, 2013)- DATA 2011
Prunus persica (L.) Batsch (peach)	Yes	According to FAO data Peach and Nectarines, cover 150.000 ha in the PRA area, mainly in Italy, Spain, Greece, France, Hungary, Bulgaria, Portugal, Poland, Romania and Croatia (FAOSTAT, 2013)- DATA 2011
Punica granatum L. (pomegranate)	Yes	Pomegranates are native to southeastern Europe. Spain, with nearly 3000 ha, is the largest western European producer of pomegranate, and production has been increasing as a result of high market prices (Costa & Melgarejo, 2000)
Pyrus L. (pears)	Yes	It grows mainly in Italy, Spain, Poland, Portugal, Belgium, Netherlands, France, Greece, Romania, Hungary, Germany, Croatia, United Kingdom, Denmark, Slovakia and Lithuania covering more than 130.000 ha (FAOSTAT, 2013)- DATA 2011
Ribes L..(currants)	Yes	Main crop in Polan covering nearly 40.000 ha, and it is also grown in France, United Kingdom, Denmark, Germany, Finland, Hungary, Czech Republic, Estonia, Netherlands, Latvia, Slovakia, Sweden, Austria, Italy, Belgium, Romania, Ireland and Sloveniaw covering an area of 19.000 ha (FAOSTAT, 2013)- DATA 2011
Rosa L. (roses)	Yes	Rose is an important commercial flower crop grown throughout the world in a wide range of climatic conditions.
Rubus L.(blackberry, raspberry)	Yes	According to FAOSTAT data, Berries nes, Blueberries, Cranberries, Gooseberries, Raspberries and Strawberries are widely distributed in most of the PRA countries covering nearly 200.000 ha in Poland, Germany, Italy, Spain, United Kingdom, Sweden, France, Lithuania, Finland, Romania, Bulgaria, Netherlands, Estonia, Austria, Czech Republic, Belgium, Portugal, Hungary, Latvia and Denmark (FAOSTAT, 2013)- DATA 2011

Host Scientific name (common name) / habitats*	**Presence in PRA area (Yes/No)**	**Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)**
Senecio (Groundsel)	Yes	Widely spread in the PRA area (University of Birmingham, 2005)
Solanum lycopersicum L. (tomato)	Yes	This crop covers nearly 280.000 ha in IItaly, Romania, Spain, Greece, Portugal, Poland, France, Bulgaria, Slovakia, Hungary, Netherlands, Croatia, Latvia, Lithuania, Belgium and Czech Republic (FAOSTAT, 2013)- DATA 2011
Solanum melongena L. (aubergine)	Yes	According to FAO data, it covers more than 27.000 ha in the PRA area, with a presence in Romania, Italy, Spain, Greece, Lithuania, France, Portugal, Bulgaria, Netherlands, Hungary, Malta, Belgium, Austria (FAOSTAT, 2013)- DATA 2011
Sorghum bicolor (L.) Moench (sorghum)	Yes	This crop covers nearly 120.000 ha in the PARA area, mainly in France, Italy, Romania, Spain, Hungary, Bulgaria, Austria (FAOSTAT, 2013)- DATA 2011
Taxus L. (yew)	Yes	*Taxus baccata* L. is present in Europe, except the east and extreme north (Flora europaea, 2011)
Theaceae D. Don	Yes, as ornamental plants	Ornamental plants
Trifolium (clovers)	Yes	It is widely spread around the PRA area
Vigna unguiculata (L.) Walp (cowpea)	Yes	Minor crop in Croatia and Cyprus (FAOSTAT, 2013)-
Vitis vinifera L. (grapevine)	Yes	Major crop widely distributed in the PRA area, covering more than 3 million ha in 2011, with a presence in France, Italy, Portugal, Romania, Greece, Germany, Bulgaria, Hungary, Austria, Croatia, Slovenia, Czech Republic, Slovakia, Malta, Luxembourg, United Kingdom, Netherlands and Belgium (FAOSTAT, 2013)- DATA 2011
Zea mays L. (maize)	Yes	Major crop widely distributed in the PRA area, covering more than 9 million ha in 2011, with a presence in Romania, France, Hungary, Italy, Germany, Bulgaria, Spain, Poland, Croatia, Austria, Slovakia, Greece, Czech Republic, Portugal, Belgium, Slovenia, Netherlands, Lithuania and Luxembourg (FAOSTAT, 2013)- DATA 2011

APPENDIX 10: RELEVANT ILLUSTRATIVE PICTURES (FOR INFORMATION)

Photo 1: Larva of P.stultana

Photo by Jack Kelly Clark
Available at:
http://www.ipm.ucdavis.edu/PMG/P/I-LP-PSTU-LV.018.html

Photo 2: Adult of P.stultana

Photo by Jack Kelly Clark
Available at:
http://www.ipm.ucdavis.edu/PMG/P/I-LP-PSTU-AD.017.html

Photo 3: Larva of Platynota stultana, overwintering in a grape berry mummy on bark.

Photo by Jack Kelly Clark.

Available at:
http://www.ipm.ucdavis.edu/PMG/P/I-LP-PSTU-LV.015.html

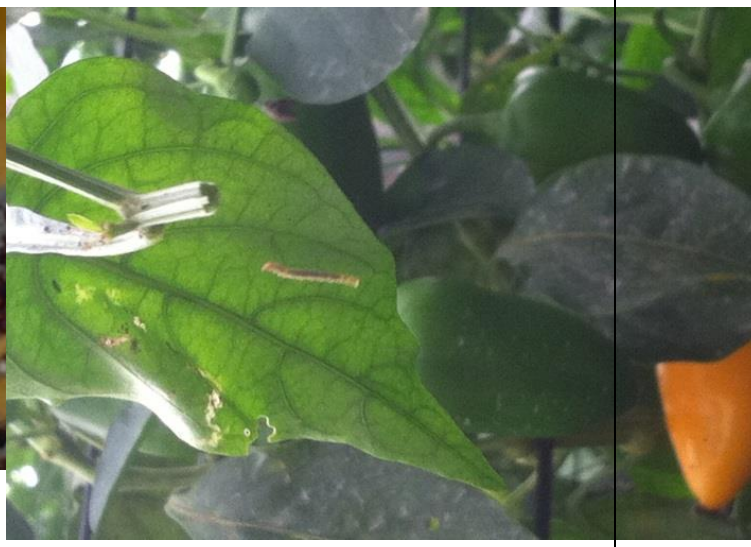


Photo 4: Larva of P.stultana hanging from silken filament in a greenhouse of peppers.

Photo 5: Larva of the omnivorous leafroller, Platynota stultana, folding a leaf by tying edges together with silk threads.

Available at:
http://www.ipm.ucdavis.edu/PMG/P/I-LP-PSTU-LV.003.html

Photo 6: Adult of P.stultana on a leaf of a pepper plant.

Source: Anonymous, 2011

APPENDIX 11: COMMENTS ON THE PATHWAYS

Plants for planting (except seeds, bulbs and tubers) with or without soil attached

- **Prohibited in the PRA area by Council Directive 2000/29/EC:**
  - **Category 2. Floriculture & Ornamental trees**

    Plants of secondary hosts ***Juniperus*** L., and ***Pinus*** L., other than fruit and seeds, originating in non-European countries are prohibited by Annex III A (1).

- **Detailed pre-existing general measures outlined in Council Directive 2000/29/EC for plants for planting**

Council Directive 2000/29/EC Annex IV A I lays down general requirements relating to plants for planting (36.1); plants of herbaceous species intended for planting (points 32.1, 32.3); trees and shrubs, either deciduous (point 40) or not (point 39); annual/biennial plants (point 41) and some herbaceous perennials (point 44), intended for planting, originating in third countries, as well as plants of herbaceous species originating in non-European countries (45.1) and plants intended for planting where relevant harmful organisms are known to occur (46). Annex IV A I (32.1) to Directive 2000/29/EC requires that **plants of herbaceous species** intended for planting (other than bulbs, corns, plants of the family Gramineae, rhizomes, seeds, tubers) originating in third countries where *Liriomyza sativae* (Blanchard) and *Amauromyza maculosa* (Malloch) are known to occur, have been grown in nurseries and; (a) originate in an area free from *L. sativae and A. maculosa* or; (b)`place of production free from *L. sativae* and *A. maculosa*, and declared free from *L. sativae* and *A. maculosa* on official inspections at least monthly during the three months prior to export or; (c) immediately prior to export, have been subjected to an appropriate treatment against *L. sativae* and *A. maculosa* and officially inspected found free from *L. sativae* and *A. maculosa.*

- Annex IV A I (32.3) to Directive 2000/29/EC requires that **plants of herbaceous species** intended for planting (other than bulbs, corns, plants of the family Gramineae, rhizomes, seeds, tubers) originating in third countries: (a) originate in an area known to be free from *Liriomyza huidobrensis* (Blanchard) and *Liriomyza trifolii* (Burgess) or; either no signs of *L. huidobrensis* and *L. trifolii* have been observed at the place of production on official inspections monthly during three months prior to harvesting or; (c) immediately prior to export, have been officially inspected and found free from *L. huidobrensis* and *L. trifolii* and treated against *L. huidobrensis* and *L. trifolii.*
- Annex IV A I (36.1) to Directive 2000/29/EC requires that **plants** intended for planting (other than bulbs, corns, rhizomes, seeds, tubers) originating in third countries have been grown in nurseries and: (a) originate in an area free from *Thrips palmi* Karny or; (b) originate in a place of production free from *T. palmi* and have been subjected to official inspections at least monthly during the three months prior to export or; (c) immediately prior to export, have been subjected to an appropriate treatment against *T. palmi* prior to export and have been officially inspected and found free from *T. palmi.*
- Annex IV A I (39) to Directive 2000/29/EC requires that **trees and shrubs**, intended for planting, other than seeds and plants in tissue culture, originating in third countries other than European and Mediterranean countries that are allowed entry into the EU are clean (i.e. free from plant debris) and free from flowers and fruits, and; have been grown in nurseries, and; have been inspected at appropriate times and prior to export, and found free from symptoms of harmful bacteria, viruses and virus-like organisms, and either found free from signs or symptoms of harmful nematodes, insects, mites and fungi, or have been subjected to appropriate treatment to eliminate such organisms.
- Annex IV A I (40) to Directive 2000/29/EC requires that **deciduous trees and shrubs,** intended for planting, other than seeds and plants in tissue culture, originating in third countries other than European and Mediterranean countries that are allowed entry into the EU are dormant and free from leaves.
- Annex IV A I (41) to Directive 2000/29/EC requires that **annual and biennial plants,** other than Gramineae, intended for planting, other than seeds, originating in countries other than European and Mediterranean countries, have been grown in nurseries and; are free from plant debris, flowers and fruits, and; have been inspected at appropriate times and prior to export, and found free from symptoms of harmful bacteria, viruses and virus-like organisms, and either found free from signs or symptoms of harmful nematodes, insects, mites and fungi, or have been subjected to appropriate treatment to eliminate such organisms.
- Annex IV A I (44) to Directive 2000/29/EC requires that **herbaceous perennial plants**, intended for planting, other than seeds, **of the families Caryophyllaceae** (except *Dianthus* L.), **Compositae** (except *Dendranthema* (DC.) Des Moul.), **Cruciferae, Leguminosae and Rosaceae** (except *Fragaria* L.), originating in third countries, other than European and Mediterranean countries, have been grown in nurseries and; are free from plant debris, flowers and fruits, and; have been inspected at appropriate times and prior to export, and found free from symptoms of harmful bacteria, viruses and virus-like organisms, and either found free from signs or symptoms of harmful nematodes, insects, mites and fungi, or have been subjected to appropriate treatment to eliminate such organisms.
- Annex IV A I (45.1) to Directive 2000/29/EC requires that **plants of herbaceous species** intended for planting (other than bulbs, corms, rhizomes, seeds and tubers) originating in non-European countries: (a)originate in an area free from *Bemisia tabaci* Genn. (non-european populations) or; (b) originate in a place of production free from *B tabaci* (non-european populations) and official inspections at least once each three weeks during the nine weeks prior to export or; (c) in cases where *Bemisia tabaci* Genn. (non-European populations) has been found at the place of production, are held or produced in this place of production and have undergone an appropriate treatment to ensure freedom from *Bemisia tabaci* Genn. (non-European populations) and subsequenly this place of production shall have been found free from *Bemisia tabaci* Genn. (non- European populations) as a consequence of the implementation of appropriate procedures aiming at eradicating *Bemisia tabaci* Genn. (non-European populations), in both official inspections carried out weekly during the nine weeks prior to export and in monitoring procedures throughout the said period.
- Annex IV A I (46) to Directive 2000/29/EC requires that **plants** intended from planting (other than seeds, bulbs, tubers, corms and rhizomes) originating in countries where Bean golden mosaic virus, Cowpea mild mottle virus, Lettuce infectious yellow virus, Pepper mild tigré virus, Squash leaf curl virus, other viruses transmitted by *Bemisia tabaci* are known to occur and where *Bemisia tabaci* (non-European populations) or other vectors of the relevant harmful organisms are known to occur;

  (a) in countries where *B. tabaci* (non-european populations) or other vectors of the relevant harmful organisms are not known to occur: no symptoms of the relevant harmful organisms have been observed on the plants during their complete cycle of vegetation or;

  (b) in countries where *B. tabaci* (non-european populations) or other vectors of the relevant harmful organisms are known to occur: no symptoms of the viroses have been observed on the plants during an adequate period, and (i) the plants originate in areas known to be free from *B. tabaci* and other vectors of the relevant harmful organisms or; (ii) the place of production has been found free from *B. tabaci* and other vectors of the relevant harmful organisms on official inspections carried out at appropriate times or; (iii) the plants have been subjected to an appropriate treatment aimed at eradicating *B.tabaci.*

Thus, relating to trees and shrubs in Categories 1 and 2, and taking into account that P.stultana is only present in Mexico and the USA:

- ➔ As a consequence of Annex III A (16), **plants of Citrus L. are prohibit from Mexico and the USA.**
- ➔ As a consequence of Annex III A (15), **plants of Vitis L. are prohibit from Mexico and the USA.**
- ➔ As a consequence of Annex III A (1), plants of **Juniperus L. and Pinus L. are prohibit from Mexico and the USA.**
- ➔ As a consequence of Annex III A (18), **plants intended for planting of *Malus domestica*** (apple); ***Prunus domestica*** (plum); ***Prunus persica*** (peach); ***Pyrus*** (pear); **are prohibited from Mexico.**
- ➔ As a consequence of Annex IV A I (39) and (40), the following **deciduous trees and shrubs from the USA** intended for planting shall be dormant and free from leaves, flowers and fruits and free from signs or symptoms of harmful insects, to be allowed entry into the European Union: ***Malus domestica*** (apple); ***Prunus domestica*** (plum); ***Prunus persica*** (peach); ***Pyrus*** (pear);

➔ As a consequence of Annex IV A I (39) and (40), the following **deciduous trees and shrubs from México or the USA** intended for planting shall be dormant and free from leaves, flowers and fruits and free from signs or symptoms of harmful insects, to be allowed entry into the European Union: ***Actinidia arguta*** (tara vine); ***Actinidia deliciosa*** (kiwifruit); ***Annona cherimola*** (cherimoya); ***Ebenaceae*** (ebony family); ***Juglans regia*** (walnut); ***Punica granatum*** (pomegranate); ***Ribes*** (currant); ***Rubus*** (blackberry); ***Albizia*** (albizia); ***Rosa*** (rose); ***Ginkgo biloba*** (maidenhair tree); ***Parkinsonia aculeata*** (Jerusalem thorn); ***Salix lasiolepis*** (arroyo willow). **Cotoneaster** *(when decidious).*

It is considered that the risk of entry of *P. stultana* is much lower for trees and shrubs free from leaves, flowers and fruits due to none of the stages of the pest are ssociated with this specific commodity. Pre-adult stages of the pest usually reside and feed on leaves: "Eggs are laid on new foliage in masses with the individual eggs overlapping each other. There are five larval instars. Each larva positions itself along the midrib of the leaf and encloses itself by rolling the edge of the leaf over with the aid of silken threads. The larva feed within the rolled leaf and when most of the leaf is consumed will move to another leaf. Pupation takes place within a rolled leaf" (Kerns et al.2004).

➔ As a consequence of Annex IV A I (39), the following (not deciduous) **trees and shrubs from México and the USA** intended for planting shall be free from flowers and fruits and **free from signs or symptoms of harmful insects,** to be allowed entry into the European Union**:** ***Persea americana*** Mill**,** ***Cotoneaster*** *(when perennial);* ***Eucalyptus*** *L;* ***Gardenia****;* ***Taxus*** *L.;* ***Theeaceae****.*

(As perennial plants, they will be allowed entry into the EU with leaves, but free from signs or symptoms of harmful insects).

On the other hand, relating to herbaceous plants in Categories 1 and 2, and taking into account that P.stultana, is present in Mexico and the USA:

➔ As a consequence of Annex IV A I (44), the following **plants from herbaceous perennial species intended for planting from México and the USA** intended for planting shall be free from flowers and fruits and **free from signs or symptoms of harmful insects**, to be allowed entry into the European Union: ***Aster*** *L. [Compositae]*

➔ In accordance with Annex IV A I (41), the following **plants from herbaceous annual and biennial species intended for planting from México and the USA** intended for planting shall be free from flowers and fruits and **free from signs or symptoms of harmful insects**, to be allowed entry into the European Union: ***Portulaca grandiflora*** *[Annual]*

As a result of the prohibitions and the provisions laid down by Council Directive Annex III and Annex IV, respectively, the only "preferred" host of *P. stultana* that is allowed entry to the EU from México or the USA with remaining leaves, fruits or flowers not applying at least the measure *"free from signs or symptoms of harmful insects",* is *Dianthus caryophyllus* L. (carnation), whereas *Chrysanthemum* L. [=Dendranthema (DC.)Des Moul], *Convolvulus* L. (bindweed), [Convolvulaceae], *Cyclamen* L. (cyclamen) [Primulaceae], *Malva* L. (mallow), [Malvaceae], *Pelargonium* L'Hér.ex Aiton (geranium) [Geraniaceae] are the only "secondary" hosts.

All of these six hosts are included in the general provisions laid for plants of herbaceous species by Annex IV A I (32.1), (32.3), (36.1), (45.1) or (46) for pests present in Mexico or the USA.

A detailed analysis of the specific regulation of these pathways and its associated risk is shown below:

➔ ***Dianthus caryophyllus*** **L. (carnation)**:

Dianthus L. intended for planting are commonly traded to Europe as seeds, **but also as cuttings, which do pose risk of pest entry.**

- Council Directive 2000/29/EC lays down several special requirements for **plants** of *Dianthus* L., intended for planting, other than seeds, to prevent entry and spread of *Helicoverpa armigera* (Hübner), *Spodoptera littoralis* (Boisd.) [Annex IV A I (27.1)], *Spodoptera eridiana* Cramer, *Spodoptera frugiperda* Smith, *Spodoptera litura* (Fabricius) [Annex IV A I (27.2)], *Erwinia chrysanthemi* pv. *dianthicola* (Hellmers) Dickey, *Pseudomonas caryophylli* (Burkholder) Starr and Burkholder and *Phialophora cinerescens* (Wollenw.) Van Beyma [Annex IV A I (29)].
- **Parts of plants**, other than fruit and seeds of *Dianthus* L., originating in third countries, shall be subject to a plant health inspection in the country of origin or the consignor country before being permitted to enter the Community [Annex V B I (2)].

➔ ***Chrysanthemum*** **L (=*Dendranthema (DC.) Des Moul):***

Chrysanthemum L. (=*Dendranthema* (DC.) Des Moul.) intended for planting are commonly traded to Europe as **cuttings, which do pose risk of pest entry**. (EUROPHYT, 2013)

- Council Directive 2000/29/EC lays down several special requirements for **plants** of *Dendranthema* (DC.) Des Moul., intended for planting, other than seeds, to prevent entry and spread of *Helicoverpa armigera* (Hübner), *Spodoptera littoralis* (Boisd.) [Annex IV A I (27.1)], *Spodoptera eridiana* Cramer, *Spodoptera frugiperda* Smith, *Spodoptera litura* (Fabricius) [Annex IV A I (27.2)], *Chrysanthemum stunt viroid*, *Puccinia horiana* Hennings, *Didymella ligulicola* (Baker, Dimock et Davis) v. Arx [Annex IV A I (28)], *Chrysanthemum stem necrosis virus* [Annex IV A I (28.1)].
- **Parts of plants,** other than fruit and seeds of *Chrysanthemum* L. (=*Dendranthema* (DC.) Des Moul.)., originating in third countries, shall be subject to a plant health inspection in the country of origin or the consignor country before being permitted to enter the Community [Annex V B I (2)].

➔ ***Pelargonium*** **(Geraniaceae)**

Pelargonium intended for planting are commonly traded to Europe as **cuttings,** but also as **"life plants and floriculture producs"which do pose risk of pest entry**. (EUROPHYT, 2013); (CEXVEG, 2013)

- Council Directive 2000/29/EC lays down several special requirements for **plants of *Pelargonium*** l'Hérit. ex Ait., intended for planting, other than seeds, to prevent entry and spread of *Helicoverpa armigera* (Hübner), *Spodoptera littoralis* (Boisd.) [Annex IV A I (27.1)], *Spodoptera eridiana* Cramer, *Spodoptera frugiperda* Smith, *Spodoptera litura* (Fabricius) [Annex IV A I (27.2)], *Tomato ringspot virus*bb sensu lato (non-European populations)or other vectors of Tomato ringspot virus [Annex IV A I (31)]

- **Parts of plants**, other than fruit and seeds of *Pelargonium* l'Herit.ex Ait., originating in third countries, shall be subject to a plant health inspection in the country of origin or the consignor country before being permitted to enter the Community [Annex V B I (2)].

→ ***Cyclamen*** **(Primulaceae),**

Data about trade of this genus has not been available for the assesors.

There is no specific regulation for this pathway. Only the above mentioned general provisions laid for plants of herbaceous species by Annex IV A I (32.1), (32.3), (36.1), (45.1) or (46.1) for pests present in Mexico or the USA.

→ ***Malva*** **(Malvaceae),**

Data about trade of this genus has not been available for the assesors.

It is kown that Malva can be traded to Europe as **cuttings, whish do pose risk of pest entry** (EUROPHYT, 2013)

There is no specific regulation for this pathway. Only the above mentioned general provisions laid for plants of herbaceous species by Annex IV A I (32.1), (32.3), (36.1), (45.1) or (46.1) for pests present in Mexico or the USA.

→ ***Convolvulus*** **L.**

Data about trade of this genus has not been available for the assesors.

It is known that *Convolvulus* L. intended for planting can be traded to Europe as **plants for planting not yet planted and also as cuttings, which do pose risk of pest entry** (EUROPHYT, 2013).

There is no specific regulation for this pathway. Only the above mentioned general provisions laid for plants of herbaceous species by Annex IV A I (32.1), (32.3), (36.1), (45.1) or (46.1) for pests present in Mexico or the USA.

Species in Category 3:

Plants of vegetable crops (Category 3), when intended for planting, are typically traded in form of seeds. This is particularly true for long-distance trade, as it is the case between North America and the European Union. Detailed trade data between U.S.A, Mexico and Spain was checked using the CEXVEG database (CEXVEG, 2013) in order to verify that no seedlings of vegetable crops have been imported from these countries in the last years (see table below).

Species	**Type of Commodity**
Beta vulgaris (beet)	Dried vegetables; seeds; pulp
Capsicum annuum (pepper)	Spices; seeds; **fresh vegetables (*)**
Citrullus lanatus (watermelon)	Seeds
Cucumis melo (melon)	Seeds
Cucumis sativus (cucumber)	Seeds
Lycopersicon esculentum (tomato)	Seeds
Mentha spp. (mint)	Dried leaves
Ocimum basilicum (sweet basil)	Seeds
Phaseolus vulgaris (common bean)	Pulses; seeds
Portulaca spp. (purslane)	Seeds

(*) Trade form liable to carry the pest.

Consequently, **plants for planting of vegetable crops originating in third countries have not been considered in the analysis.**

P-III. Cut flowers or branches with foliage

Consignments originating outside the European Union

Category 2. Floriculture & Ornamental trees

Regarding cut flowers:

Cut flowers of the "**secondary**" hosts of *P. stultana* include ***Chrysanthemum*** L (=*Dendranthema (DC.) Des Moul).*

Part of plants, other than fruit and seeds of *Chrysanthemum* L (=*Dendrathema* (DC) Des. Moul), *Dianthus* L., *Pelargonium* L'Hér. ex. Aiton, originating in third countries and cut flowers of *Rosa* L. originating in non-European countries shall be subject to a plant health inspection in the country of origin before being permitted to enter into the Community [Annex V B I (2)].

Trade Data

According to Datacomex, the E.U imports the following cut flowers from the USA and Mexico.

Trade from USA and Mexico into E.U(t)

	2009	**2010**	**2011**	**2012**
Fresh cut **chrysanthemum** and buds, of a kind suitable for bouquets or for ornamental purposes (Taric: 06031400)	-	-	-	-

Source: http://datacomex.comercio.es/index.htm

Regarding cut branches with foliage:

Regarding branches with foliage, none of the "preferred" or "secondary" hosts are commonly used for this purpose and the analysis of trade data has confirmed that, in the last years, there have been a very low number of imports of any known hosts of *Platytona stultana* in the form of branches with foliage.

Thus, this pathway is not further considered. Nevertheless, if trade changes in the future, this pathway should be revised.

P-II. Fruits of fruit trees;

and vegetables (fruits, stems, leaves or flower plant parts for fresh consumption)

-II.(i). Consignments originating outside the European Union

Category 1. Fruits of fruit trees

Fruits of "**secondary**" hosts of *P. stultana* include tara vine, cherimoya, walnut, avocado and currant. As explained in Q.2, secondary hosts are those that *P. stultana* can try to colonize only if preferred hosts are not present. Futhermore, taking into account that *P. stultana* is a pest that usually feeds on leaves; it will be considered that the association of the pest with fruits of "secondary"hosts is unlikely.

Category 3. Vegetables

- Stem -vegetables of "**secondary**" hosts of *P. stultana* include celery, but it is **not considered a pathway** as it is traded in a form not liable to carry the pest.
- Leafy-vegetables of "**secondary**" hosts of *P. stultana* include mint and sweet basil, but these are **not considered pathways** as they are usually traded in forms not liable to carry the pest (dried leaves and seeds)
- The rest of vegetables (including fruits, stem, leaves or flower plant parts, depending on each case) of the "**secondary**" hosts of *P. stultana* include common beet, watermelon, melon, cucumber, bean, common bean, tomato and eggplant. As explained in Q.2, secondary hosts are those that *P. stultana* can try to colonize only if preferred hosts are not present. Futhermore, taking into account that *P. stultana* is a pest that usually feeds on leaves; it will be considered that the association of the pest with fruits of "secondary"hosts is unlikely. These are **not considered pathway**.