

Summary of the Express Pest Risk Analysis for *Cryptophlebia ombrodelta*

PRA area: Ireland

Describe the endangered area: The wider Irish environment (outdoors)

Main conclusions

Considering all elements of the pests' biology it is unlikely that *C. ombrodelta* poses a significant threat to Irish biosecurity. Though the pest has been intercepted on imported fresh produce on several occasions, there are few known host species present in the wider Irish Environment or produced under protected cultivation. The pest needs 5 weeks during the summer months to complete its lifecycle in tropical and sub-tropical regions at temperatures that greatly exceed those typically experienced in Ireland. It therefore seems unlikely that the pest would be able to complete its lifecycle in the Irish climate given how considerably colder our summers are compared to its native distribution range.

While the pest is of little threat to Irish biosecurity it is likely a potential threat to other EU MS. In the EU *Phaseolus spp.* and *Glycine max* (soybean) which are known hosts, are commercially cultivated in more southerly regions where the pest is more likely to establish. Given the uncertainty around the lower temperature tolerances of the pest a policy of continued exclusion throughout the EU should be applied when the pest is encountered in imported plant commodities to prevent its possible entry and establishment in the EU.

Known host species (*Vigna spp.*, *Phaseolus spp.*, etc) imported from regions where the pest is present should be continued to be inspected and a policy of exclusion implemented until a full EU/EPPO PRA is undertaken.

Phytosanitary risk for the endangered area (*Individual ratings for likelihood of entry and establishment, and for magnitude of spread and impact are provided in the document*)

High <input type="checkbox"/>	Moderate <input type="checkbox"/>	Low <input checked="" type="checkbox"/>
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Level of uncertainty of assessment (*see section 17 for the justification of the rating. Individual ratings of uncertainty of entry, establishment, spread and impact are provided in the document*)

High <input type="checkbox"/>	Moderate <input type="checkbox"/>	Low <input checked="" type="checkbox"/>
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Other recommendations:

- Submit IE PRA to EPPO
- Produce Pest factsheet for inclusion on Irish Plant pest risk register

Express Pest Risk Analysis (Ireland):

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Cryptophlebia ombrodelta

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Stage 1. Initiation

Reason for performing the PRA:

Ireland reported an interception of *Cryptophlebia ombrodelta* on a shipment of *Vigna* imported through the UK from Malaysia on the (25/03/2021). This pest had previously been intercepted once before by IE on a shipment of black-eyed/cow pea (*Vigna unguiculata*) originating from Viet Nam in 2020. As there are no relevant PRAs and a general lack of detailed information available on the CABI and EPPO databases for this pest, a rapid PRA was initiated to determine the level of threat the pest potentially posed to Irish Biosecurity.

PRA area: *Ireland*

Stage 2. Pest risk assessment

1. Taxonomy & Nomenclature

Cryptophlebia ombrodelta is more commonly known as the lichi fruit moth or macadamia nut borer in its native and introduced distribution ranges (EPPO, 2022). The species was first recorded by Foggett in 1897 on *Acacia farnesiana* (Sweet Acacia) in New South Wales, Australia, and first described by Oswald B. Lower in 1898 (Ironsides, 1974). It has been reported under several other synonyms over the years including *Arctiophora ombrodelta*; *Argyroploce carpophaga*; *Arotrophora ombrodelta*; *Cryptophlebia carpophaga*; *Pogonozada*; *Thaumatotibia* (Hardy, 2007; Patel, 2016). The revision of the genus *Cryptophlebia* by Bradley established the current nomenclature of the species (Ironsides, 1974).

Recently, several *Cryptophlebia* species (including *Cryptophlebia leucotreta*, commonly known as the “false codling moth”) were moved to the genus *Thaumatotibia* (Berkeley, 2021). It has been postulated that *Cryptophlebia* may be a junior synonym of the genus *Pseudogalleria*, though at present no formal action has been taken to synonymize the two (Berkeley, 2021).

2. Pest overview

2.1 Origin

The exact origin of the *C. ombrodelta* is uncharacterised. However, it is currently considered native to a number of Asian, Australasian and Polynesian countries.

2.2 Current Distribution

The pest appears to be largely associated with warmer climates of the Pacific and coastal areas. Currently, the pest is widespread throughout Southeast Asian, Polynesian and Australasian countries (CABI, 2021). A visual representation of the current known distribution range of *C. ombrodelta* is provided in Figure 1. While there are species of *Cryptophlebia* native to Hawaii (notably the pest *C. illepedia*), *C. ombrodelta* is considered to be an introduced species to those islands (Follett and Lower, 2000). Records indicate the pest was established in Hawaii by at least 1958 (Ironsides, 1974).

A 1997 USA pest risk assessment identified *Cryptophlebia spp.* as the most commonly intercepted insect pests in sapindaceous fruits carried in US passenger baggage and arriving in the mail (Follett and Lower, 2000). However, *C. ombrodelta* has not been reported to have ever become established on mainland USA.

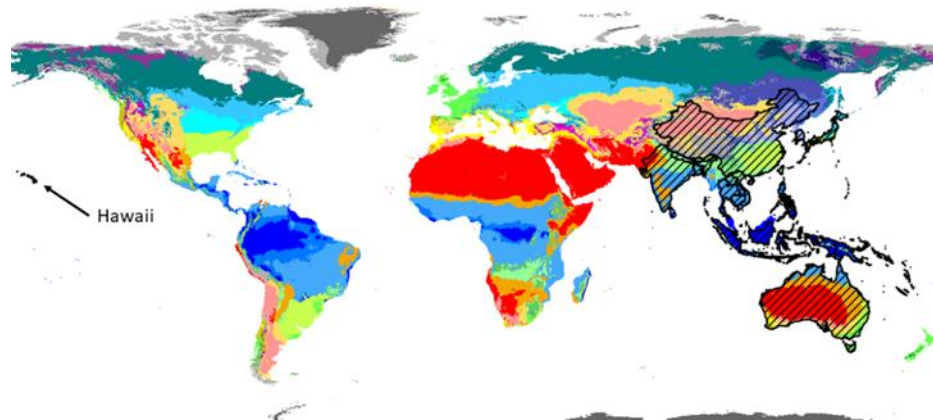


Figure 1: Global distribution of *C. ombrodelta* overlaid on Koppen-Geiger climate classifications of regions.

2.3 Hosts

Larvae of *C. ombrodelta* are considered to be a moderately polyphagous and have been most widely associated with attacking many species of the Fabaceae family (Hardy 2007; TortAI, 2021). A listing of hosts by CABI in 2001 considered *Acacia spp.* (wattles), *Averrhoa carambola* (carambola), *Bauhinia spp.*, *Cassia spp.* (sennas), *Glycine max* (soyabean), *Lablab purpureus* (hyacinth bean), *Litchi chinensis* (litchi), *Macadamia integrifolia* (macadamia), *Durio zibethinus* (durian), *Parkia spp.*, *Persea americana* (avocado), *Phaseolus lunatus* (lima bean), *Phaseolus vulgaris* (common bean), *Tamarindus indica* (Indian tamarind), *Vigna unguiculata* (cowpea) as the “major” hosts (Hardy, 2007). However, Longan fruits (*Dimocarpus longan*) can also now be considered as major hosts of these species (Follett and Sanxter, 2001; TortAL, 2021). A full list of currently known host plant species is given in Section 7.

2.4 Lifecycle & Aetiology

The lifecycle of *C. ombrodelta* has been reported on several host plant species including macadamia, lychee, longan, lima beans, maize, carambola and snap beans (DAF, 2021; Hardy, 2007; Ironside, 1974). Many of these studies took place under laboratory conditions at temperature ranging between 23-28°C such as for lima beans, maize, carambola and snap beans, however, for lychee, longan, macadamia there are field data available (Hardy, 2007). In the laboratory studies the lifecycle on these plants was found to range from 3-7 days for egg development: 13-26 for larval development and 4-10.8 days for pupal development (Hardy, 2007). Adult development varied highly and took between 2-19 days (Hardy, 2007).

A complete lifecycle of an *C. ombrodelta* infestation on macadamia nuts in Australia was described by Ironside (1974). The lifecycle on macadamia nuts was completed within 5 weeks during the summer months and broadly consisted of the following stages: egg development from laying to hatching: 4 days, larval development: 21-27 days and pupal development until adult emergence: 8 days (Ironside, 1974). The lifecycle of *C. ombrodelta* on macadamia and signs of infestation are depicted in Figure 1. The Queensland Dept. of Agriculture and Fisheries (DAF, 2021) horticultural pest list considers the primary commercial hosts of *C. ombrodelta* in that region as being lychee, longan, macadamia and reports a similar lifecycle to that reported by Ironside. The DAF (2021) reports the *C. ombrodelta* lifecycle as consisting of; egg hatching 4-6 days, larval stage 21-28 days, pupal stage 8-10 days, after which adult moth emergence occurs. In India the pest appears to produce between 3-4 generations per year (Patel *et al.*, 2016). Patel *et al.* (2016) characterised the lifecycle of *C. ombrodelta* on tamarind under laboratory conditions though did not state at what temperature. Their study found eggs hatching took 6-9 days, with mature eggs measuring approximately 1mm in diameter. The larval stage on tamarind took 18-23 days, ranged from 5-6 instars, with the mature larvae reaching lengths of 1.7 - 2.14cm. Pupa were 0.8 – 1.1 cm long and development took 12-16 days for adult moths to emerge.

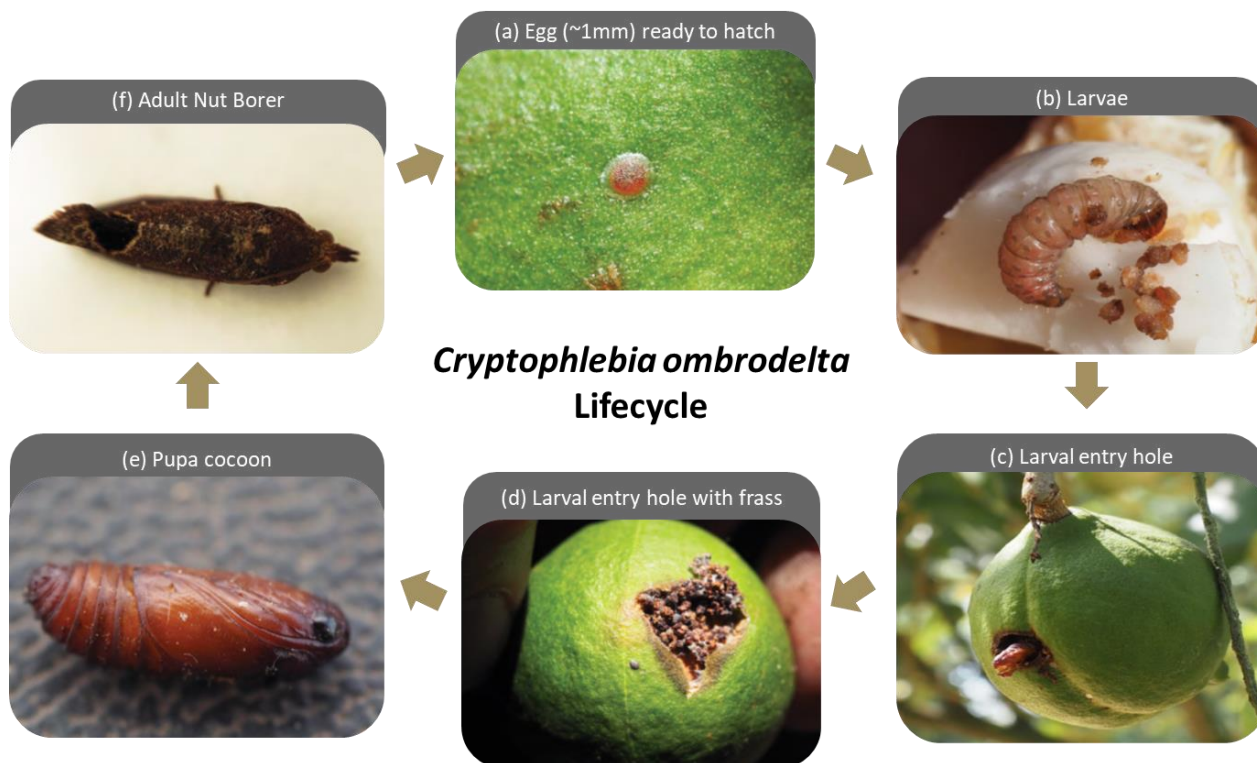


Figure 1: Lifecycle of *C. ombrodelta* on macadamia (Images taken from Bright, 2020)

Females *C. ombrodelta* were reported to lay between 116-183.2 eggs per individual (Hardy, 2007). *Cryptophlebia spp.* typically lay their eggs singly on a fruit/nut surface with up to 15 eggs found on macadamia (Follett and Sanxter, 2001; Ironside, 1974). Adults typically prefer to lay their eggs on the surface of damaged fruit/nuts (Sinclair, 1979). Hatched neonate larvae bore through the fruit/husk skin to feed at the skin/pulp interface before attempting to bore to the seed (Follett and Sanxter, 2001; Follett et al., 2003). Damaged fruit/nut are typically more easily entered by young larvae and increases the probability of survival (Sinclair, 1975). The species appears to have a variable number of larval instar stages in its lifecycle - five or six (Sinclair, 1975; Patel et al., 2016). Numbers of *C. ombrodelta* individual larvae found on infested fruit/nut tend to be low (Sinclair, 1975). While many eggs may be laid on a fruit/nut surface generally only one larva is found feeding in a fruit (Follett and Sanxter, 2001). This may be a result of the cannibalistic characteristics reportedly observed in *C. ombrodelta* larvae, which typically appear when population density is higher (Blanco-Metzler et al., 2001; Sinclair, 1975). In legumes the fully grown larva of *C. ombrodelta* leave the ripe pod through a hole and pupate on the pod in a solid cocoon, partially made up of frass (Hardy, 2007).

There is little to no information on the overwintering strategies of *C. ombrodelta* in colder climates. Developmental progress of *C. ombrodelta* is usually within a temperature range above 20°C, although there is no literature to suggest that the moth cannot survive below this (Hardy, 2007). The Hardy (2007) pest risk assessment for litchi imports from Taiwan recommended cold disinfestation treatment of 0-1°C or below for 13 days to be likely sufficient for eradication of *C. ombrodelta* on fresh produce imports.

2.5 Management, Monitoring and Control Options

3. Is the pest a vector? Yes No

If the pest is a vector, which organism(s) is (are) transmitted and does it (do they) occur in the PRA area?

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

If a vector is needed, which organism(s) serves as a vector and does it (do they) occur in the PRA area?
Consider both the pest and the vector in the assessment.

5. Regulatory status of the pest

As of November 2022, *C. ombrodelta* was regulated as a Quarantine pest in Israel (since 2009) and was listed as an A1 list pest in Brazil and Chile (EPPO 2022).

6. Distribution

Continent	Distribution (list countries, or provide a general indication, e.g. present in West Africa)	Provide comments on the pest status in the different countries where it occurs e.g. widespread, native, introduced....)	Reference
<i>Africa</i>			
<i>America</i>	<i>USA (Hawaii)</i>	<i>Introduced</i>	<i>Follett and Lower, 2000</i>
<i>Asia</i>	<i>China, Guam, India, Indonesia, Japan; Sri Lanka, Malaysia, Nepal, Philippines, Taiwan, Thailand, Vietnam,</i>		<i>Patel et al., 2016</i>
<i>Europe</i>			
<i>Oceania</i>	<i>Australia, North Mariana Islands, Papua New Guinea, Solomon Islands, Vanuatu</i>	<i>Established</i>	<i>Hardy, 2007</i>

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

Plant species are considered present in the PRA area if they are native or widely cultivated in IE. The host list has been taken from TortAL (2021).

Host Scientific name (common name)	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, <i>major/minor habitats*</i>)	Reference
<i>Cocos nucifera</i> L. (coconut palm)	No		
<i>Nephelium lappaceum</i> L. (rambutan)	No		
<i>Acacia farnesiana</i> (L.) Willd. (sweet acacia)	No		
<i>Acacia</i> Mill.	No		
<i>Acacia nilotica</i> (L.) Willd. ex Delile (gum arabic tree)	No		
<i>Adenanthera pavonina</i> L. (red beadtrees)	No		
<i>Bauhinia hirsuta</i> Weinm. (orchid tree)	No		
<i>Bauhinia</i> L.	No		

Host Scientific name (common name)	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, <i>major/minor habitats*</i>)	Reference
<i>Bauhinia malabarica</i> Roxb. (orchid tree)	No		
<i>Bauhinia purpurea</i> L. (butterfly tree)	No		
<i>Caesalpinia decapetala</i> (Roth) Alston (shoofly)	No		
<i>Caesalpinia pulcherrima</i> (L.) Sw. (pride-of-Barbados)	No		
<i>Caesalpinia sappan</i> L. (sappanwood)	No		
<i>Cassia fistula</i> L. (golden shower tree)	Yes	Widely used as an ornamental	
<i>Cassia javanica</i> L. X <i>fistula</i> L. (rainbow shower tree)	No		
<i>Cassia</i> L.	No	No native species	
<i>Delonix</i> Raf.	No		
<i>Delonix regia</i> (Bojer ex Hook.) Raf. (royal poinciana)	No		
<i>Glycine max</i> (L.) Merr. (soybean)	No		
<i>Indigofera suffruticosa</i> Mill. (anil de pasto)	No		
<i>Parkinsonia aculeata</i> L. (Jerusalem thorn)	No		
<i>Phaseolus</i> L. (bean)	Yes		
<i>Phaseolus lunatus</i> L. (sirva bean)	No		
<i>Phaseolus vulgaris</i> L. (kidney bean)	Yes	Used in home gardening, not widely commercially cultivated currently	
<i>Pithecellobium dulce</i> (Roxb.) Benth. (monkeypod)	No		
<i>Poinciana</i> L.	No	No native species	

Host Scientific name (common name)	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, major/minor habitats*)	Reference
<i>Prosopis juliflora</i> (Sw.) DC. (mesquite)	No	Considered as possible invasive risk to Ireland	
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kunth (kiawe)	No		
<i>Senna alata</i> (L.) Roxb. (emperor's candlesticks)	No		
<i>Senna bicapsularis</i> (L.) Roxb. (Christmasbush)	No		
<i>Senna</i> Mill.	No	No native species	
<i>Senna occidentalis</i> (L.) Link (septicweed)	No		
<i>Senna septentrionalis</i> (Viv.) H. Irwin & Barneby (arsenic bush)	No		
<i>Senna sophera</i> (L.) Roxb. (algarrobilla)	No		
<i>Sesbania bispinosa</i> (Jaq.) W. Wight (dunchi fiber)	No		
<i>Sesbania grandiflora</i> (L.) Poir. (vegetable hummingbird)	No		
<i>Sesbania</i> Scop.	No	No native species	
<i>Tamarindus indica</i> L. (tamarind)	No		
<i>Averrhoa carambola</i> L. (carambola)	No		
<i>Coccoloba uvifera</i> (L.) L. (seagrape)	No		
<i>Buckinghamia celsissima</i> F. Muell. (ivory curl)	No		
<i>Macadamia</i> F. Muell.	No		

Host Scientific name (common name)	Presence in PRA area (Yes/No)	Comments (e.g. total area, major/minor crop in the PRA area, <i>major/minor habitats</i> *)	Reference
<i>Aegle marmelos</i> (L.) Corr. Serr. (Indian bael)	No		
<i>Citrus</i> L.	No	No native species	
<i>Citrus X sinensis</i> (L.) Osbeck (pro sp.) [<i>maxima X reticulata</i>] (sweet orange)	No		
<i>Limonia</i> L.	No		
<i>Limonium acidissima</i> L. (Indian woodapple)	No	Plant so f this genus are native to Ireland (<i>Limonium humile</i>)	
<i>Cupaniopsis anacardioides</i> (A. Rich.) Radlk. (carrotwood)	No		
<i>Dimocarpus longan</i> Lour. (longan)	No		
<i>Filicium decipiens</i> Thwaites	No		
<i>Litchi chinensis</i> Sonn. (litchi)	No		

8. Pathways for entry

The likelihood on entry is high given the number of times this pest has been intercepted on fresh produce in recent years.

Possible pathways (in order of importance)	Short description explaining why it is considered as a pathway	Pathway prohibited in the PRA area? Yes/No	Pest already intercepted on the pathway? Yes/No
<i>Vigna spp.</i>	This pest has been intercepted on fresh produce of <i>Vigna spp.</i> imports by EU MS on several occasions	No	Yes
<i>Phaseolus spp.</i>	The pest was reported on imports of <i>Phaseolus/Vigna unguiculata</i> from Viet Nam	No	Yes
<i>Moringa/Coccinia grandis/Lagenaria siceraria</i>	The pest was reported present on a consignment originating in India of the reported species. Though none are reported as host species	No	Yes

Rating of the likelihood of entry	Low <input type="checkbox"/>	Moderate <input type="checkbox"/>	High <input checked="" type="checkbox"/>
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Rating of uncertainty	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>
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9. Likelihood of establishment outdoors in the PRA area

There is a lack of known host species for *C. ombrodelta* present in Ireland. While the pest may be capable of host jumping there is no current reason to think it would thrive on plant species present in the wider Irish environment. Additionally, the Irish climate is likely to be a limiting factor for establishment of *C. ombrodelta* as it appears to favour warmer, typically coastal climates (though it is reported in some inland areas). However, it has never been tested to determine if the species it could complete its lifecycle at temperatures <20°C (Hardy, 2007). In Queensland (Australia) it typically takes about 5 weeks to complete its lifecycle during the summer (Queensland Government Department of Agriculture and Fisheries, 2022). The average monthly temperatures in Queensland are substantially higher than those experienced in Ireland (the table below compares the average monthly temperatures in one of the warmest Ireland counties: Wexford to one of the coldest regions in Queensland: Toowoomba). The average monthly differences are largely very substantial, even the Irish Summer months are on average only slightly warmer than the Queensland winter. As our average monthly temperatures do not exceed 16°C it is highly likely that our climate will not support *C. ombrodelta*.

Hardy (2007) postulated that for New Zealand climate was possibly a limiting factor to establishment, particularly in the winter months. The risk of *C. ombrodelta*'s potential for establishment in New Zealand was highlighted as potentially possible for only the warmer northerly region which has average monthly temperatures similar to Toowoomba (Hardy, 2007).

Comparison of average air temperatures between Wexford (Ireland) and Queensland (Australia). Data taken from climate-data.org (https://en.climate-data.org/)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wexford	7	6.7	7.3	8.9	11.3	13.7	15.4	15.5	14.3	12.1	9.2	7.9
Toowoomba	23.5	22.6	21.3	18.5	15.2	12.6	11.8	13.2	16.6	19	20.9	22.4
Difference	-16.5	-15.9	-14	-9.6	-3.9	1.1	3.6	2.3	-2.3	-6.9	-11.7	-14.5

Rating of the likelihood of establishment outdoors	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>
Rating of uncertainty	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>

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

No known hosts of *C. ombrodelta* are cultivated, at least widely, under protected cultivation in Ireland.

Rating of the likelihood of establishment in protected conditions	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>
Rating of uncertainty	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>

11. Spread in the PRA area

There appears to be little information available on the dispersal range for adult moths that take flight. It must be assumed that wind assisted dispersal of moths in flight could transport them substantial distances. Given the relatively small size of the island of Ireland, should the pest enter and in the unlikely event establish that dispersal throughout the country would be highly possible.

Rating of the magnitude of spread	Low <input type="checkbox"/>	Moderate <input type="checkbox"/>	High X
Rating of uncertainty	Low <input type="checkbox"/>	Moderate X	High <input type="checkbox"/>

12. Impact in the current area of distribution

12.1 Economic Impact

In the regions where *C. ombrodelta* is present the most economically import crops it infests include macadamia (*Macadamia integrifolia*), lychee (*Litchi chinensis*), longan (*Dimocarpus longan*) and tamarind

(*Tamarindus indica*). While the pest is considered to have substantial effects on crops in its native and introduced regions the estimations of its economic impacts of *C. ombrodelta* appear to be rarely characterised and reported.

While *C. ombrodelta* is considered a major pest of lychee and longan fruits, laboratory tests and field surveys in Hawaii have indicated that these plants are actually poor hosts for *Cryptophlebia spp.* (Follett and Sanxter, 2001). Reported damage from larval feeding is often minimal, and larval survival to pupation is rare when fruit are on the tree (Follett and Sanxter, 2001). Studies in Hawaii found infestation rates for lychee and longan to be 1.1 and 0.14% respectively (Hardy, 2007). Larva which bore toward the lychee seed at the peduncle can reach the seed and survive, however, if the larva attempts to bore through the mature flesh, it usually drowns in the juice that seeps in from the wound caused by its feeding (Follett et al., 2003). Phytosanitary measures are in place to prevent the introduction of *C. ombrodelta* from Hawaii to mainland USA. Irradiation of lychee and longan fruits exported from Hawaii has been shown to effectively control *Cryptophlebia spp.* with *C. ombrodelta* found to be more susceptible than *C. illepidia* (Follett and Lower, 2000). The irradiation quarantine treatment of a minimum absorbed dose of 250 Gy approved for Hawaii's fruits was found to effectively disinfest fruits of any *Cryptophlebia spp.* in addition to fruit flies (Follett and Lower, 2000). However, late larval instars of *C. ombrodelta* were more tolerant of hot water immersion than *C. illepidia*, though none survived immersion in 49°C water for >16 min (Follett and Sanxter, 2001).

In Australia *C. ombrodelta* adults are present throughout the year, though damage to nut orchards was typically highest from December – February (Ironside, 1974). The infestation of macadamia nuts by *C. ombrodelta* induces premature nut fall, particularly during the oil accumulation stage (Bright, 2020). *Cryptophlebia ombrodelta* is considered a major pest of longan, lychee and macadamia crops with infestations occurring in most seasons (DAF, 2021).

In India *C. ombrodelta* fruit loss on Bael (*Aegle marmelos*) and tamarind (*Tamarindus indica*) crops was reported to range from 3.5-10% (Patel, 2016).

Management, Monitoring and Control Options

Monitoring for this species presents some difficulties. Several studies have shown that trap height is an important factor for efficacy. The success rate of pheromone traps is significantly improved when placed at or ≥5m from the ground (Chang, 1995; Vickers et al., 1998). Chang (1995) demonstrated that when monitoring in Hawaii for *C. ombrodelta* more males were caught at trap heights of >9m than below, this was in marked contrast to *C. illepidia* for which the opposite was true. Males of the species are more easily lured by pheromones than females (Sinclair and Sinclair, 1980; Chang, 1995; Vickers, 1998). In an assessment of the efficacy of 8 different trap types for *C. ombrodelta* mixed results were found (Sinclair and Sinclair, 1980). The commercial pheromone lure Orfamone II, containing cis-8-dodecenyl acetate and dodecyl alcohol, was found suitable for extensive extra-orchard surveys of moth breeding sites, however, bait, emergence, flight, malaise and sticky traps were ineffective (Sinclair and Sinclair, 1980).

In Australia there are a range of natural predators which contribute to controlling *C. ombrodelta* populations (DAF, 2021, Sinclair, 1979). The African egg parasitoid *Trichogrammatoidea cryptophlebiae* which has become established in Australia has been reported to provide excellent area wide control of the *C. ombrodelta* (Bright, 2020; DAF, 2021, Huwer et al., 2011). The development and production of MacTrix (commercialised *T. cryptophlebiae*) has reportedly removed the need to spray macadamia crops specifically for *C. ombrodelta* at certain times of the year (Bright, 2020). Numerous larval parasites native to Australia have also been shown to prey on *C. ombrodelta* including the braconid wasps, *Apanteles briareus* Nixon, and *Bracon sp.*, the ichneumonid wasp, *Gotra bimaculatus* Cheesman, and an unidentified tachinid fly parasite (DAF, 2021). Chemical control options are also available for control of *C. ombrodelta* for lychee and longan crops in Australia which have included tebufenozide and methoxyfenozide (DAF, 2021; Huwer et al, 2011).

12.2 Ecological Impact

There is little reported damage to the wider environment from introductions of *C. ombrodelta*.

12.3 Sociological Impact

There is little reported social implications resulting from infestations and introductions of *C. ombrodelta*.

Rating of the magnitude of impact in the current area of distribution	Low <input type="checkbox"/>	Moderate X	High <input type="checkbox"/>
Rating of uncertainty	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>

The rating chosen should be based on the highest type of impact.

13. Potential impact in the PRA area

No economic, environmental or social impacts would be expected if this pest was introduced into Ireland. This decision was reached based on the low likelihood of the pest being capable of establishing in the Irish climate and the lack of known host species present.

Will impacts be largely the same as in the current area of distribution? No

If No

Rating of the magnitude of impact in the area of potential establishment	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>
Rating of uncertainty	Low X	Moderate <input type="checkbox"/>	High <input type="checkbox"/>

14. Identification of the endangered area

None

15. Overall assessment of risk

Considering all elements of the pests' biology it is unlikely that *C. ombrodelta* poses a significant threat to Irish biosecurity. Though the pest has been intercepted on imported fresh produce on several occasions, there are few known host species present in the wider Irish Environment or produced under protected cultivation. The pest needs 5 weeks during the summer months to complete its lifecycle in tropical and sub-tropical regions at temperatures that greatly exceed those typically experienced in Ireland. It therefore seems unlikely that the pest would be able to complete its lifecycle in the Irish climate given how considerably colder our summers are compared to its native distribution range.

While the pest is of little threat to Irish biosecurity it is likely a potential threat to other EU MS. In the EU *Phaseolus spp.* and *Glycine max* (soybean) which are known hosts, are commercially cultivated in more southerly regions where the pest is more likely to establish. Given the uncertainty around the lower temperature tolerances of the pest a policy of continued exclusion throughout the EU should be applied when the pest is encountered in imported plant commodities to prevent its possible entry and establishment in the EU.

Stage 3. Pest risk management

16. Phytosanitary measures

Known host species (*Vigna spp.*, *Phaseolus spp.*, etc) imported from regions where the pest is present should be continued to be inspected and a policy of exclusion implemented until a full EU/EPPO PRA is undertaken.

17. Uncertainty

Research into the minimum temperatures this species requires for lifecycle development are necessary to determine its exact environmental tolerances. However, it appears its lifecycle development will be unsuited to the Irish climate.

The wide host range of Fabaceae plants may mean there are wild species in Ireland which it could possibly infest.

18. Remarks

- A summary factsheet will be prepared on the pest and added to the Irish plant pest risk register.
- Request update of EPPO *Cryptophlebia ombrodelta* database in line with PRA information.

19. REFERENCES

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