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Pest categorisation of *Spodoptera eridania*

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Abstract

The EFSA Panel on Plant Health performed a pest categorisation of *Spodoptera eridania* (Lepidoptera: Noctuidae) for the European Union (EU). *S. eridania* (southern armyworm) is a highly polyphagous pest native to the Americas which has spread to Africa being first reported there in 2016. There are multiple generations per year. Although it can endure short freezing periods, prolonged frosts are lethal. Eggs are laid in batches on the leaves of host plants. Five to seven larval instars follow. Like other armyworms, early instars are gregarious and cause leaf skeletonisation. Older instars disperse and become more solitary and nocturnal. Larvae feed on field vegetables and can bore into tomato fruit. They can eat apical portions of branches and can bore into stems and tubers if preferred foods are scarce. Pupation takes place in the soil. *S. eridania* is regulated in the EU by Directive 2000/29/EC (Annex IAI). Within this Directive, a prohibition of soil imported from countries where *S. eridania* occurs, prevents the entry of *S. eridania* pupae. However, immature stages on plants (excluding seeds), fruit and flowers provide potential pathways for entry into the EU. *S. eridania* adults have been intercepted in the EU as hitchhikers. Climatic conditions and the wide availability of host plants provide conditions to support establishment in frost-free regions of the EU. It could spread more widely forming transient populations during summer months. Impacts on field vegetables and ornamentals would be possible. Phytosanitary measures are available to reduce the likelihood of entry. *S. eridania* satisfies the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest. *S. eridania* does not meet the criteria of (a) occurring in the EU, and (b) plants for planting being the principal means of spread for it to be regarded as a potential Union regulated non-quarantine pest.

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1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

1.1.1. Background

Council Directive 2000/29/EC¹ on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community establishes the present European Union plant health regime. The Directive lays down the phytosanitary provisions and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union. In the Directive's 2000/29/EC annexes, the list of harmful organisms (pests) whose introduction into or spread within the Union is prohibited, is detailed together with specific requirements for import or internal movement.

Following the evaluation of the plant health regime, the new basic plant health law, Regulation (EU) 2016/2031² on protective measures against pests of plants, was adopted on 26 October 2016 and will apply from 14 December 2019 onwards, repealing Directive 2000/29/EC. In line with the principles of the above mentioned legislation and the follow-up work of the secondary legislation for the listing of EU regulated pests, EFSA is requested to provide pest categorisations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/ pest categorisation is not available.

1.1.2. Terms of Reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002³, to provide scientific opinion in the field of plant health.

EFSA is requested to prepare and deliver a pest categorisation (step 1 analysis) for each of the regulated pests included in the appendices of the annex to this mandate. The methodology and template of pest categorisation have already been developed in past mandates for the organisms listed in Annex II Part A Section II of Directive 2000/29/EC. The same methodology and outcome is expected for this work as well.

The list of the harmful organisms included in the annex to this mandate comprises 133 harmful organisms or groups. A pest categorisation is expected for these 133 pests or groups and the delivery of the work would be stepwise at regular intervals through the year as detailed below. First priority covers the harmful organisms included in Appendix 1, comprising pests from Annex II Part A Section I and Annex II Part B of Directive 2000/29/EC. The delivery of all pest categorisations for the pests included in Appendix 1 is June 2018. The second priority is the pests included in Appendix 2, comprising the group of *Cicadellidae* (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), the group of *Tephritidae* (non-EU), the group of potato viruses and virus-like organisms, the group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L., and the group of *Margarodes* (non-EU species). The delivery of all pest categorisations for the pests included in Appendix 2 is end 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pest categorisations should be delivered by end 2020.

For the above mentioned groups, each covering a large number of pests, the pest categorisation will be performed for the group and not the individual harmful organisms listed under "such as" notation in the Annexes of the Directive 2000/29/EC. The criteria to be taken particularly under consideration for these cases, is the analysis of host pest combination, investigation of pathways, the damages occurring and the relevant impact.

Finally, as indicated in the text above, all references to 'non-European' should be avoided and replaced by 'non-EU' and refer to all territories with exception of the Union territories as defined in Article 1 point 3 of Regulation (EU) 2016/2031.

¹ Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169/1, 10.7.2000, p. 1–112.

² Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants. OJ L 317, 23.11.2016, p. 4–104.

³ Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31/1, 1.2.2002, p. 1–24.

1.1.2.1 Terms of Reference: Appendix 1

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Aleurocanthus</i> spp.	<i>Numonia pyrivorella</i> (Matsumura)
<i>Anthonomus bisignifer</i> (Schenkling)	<i>Oligonychus perditus</i> Pritchard and Baker
<i>Anthonomus signatus</i> (Say)	<i>Pissodes</i> spp. (non-EU)
<i>Aschistonyx eppoi</i> Inouye	<i>Scirtothrips aurantii</i> Faure
<i>Carposina niponensis</i> Walsingham	<i>Scirtothrips citri</i> (Moultext)
<i>Enarmonia packardi</i> (Zeller)	<i>Scolytidae</i> spp. (non-EU)
<i>Enarmonia prunivora</i> Walsh	<i>Scrobipalopsis solanivora</i> Povolny
<i>Grapholita inopinata</i> Heinrich	<i>Tachypterellus quadrigibbus</i> Say
<i>Hishomonus phycitis</i>	<i>Toxoptera citricida</i> Kirk.
<i>Leucaspis japonica</i> Ckll.	<i>Unaspis citri</i> Comstock
<i>Listronotus bonariensis</i> (Kuschel)	

(b) Bacteria

Citrus variegated chlorosis	<i>Xanthomonas campestris</i> pv. <i>oryzae</i> (Ishiyama)
<i>Erwinia stewartii</i> (Smith) Dye	Dye and pv. <i>oryzicola</i> (Fang, et al.) Dye

(c) Fungi

<i>Alternaria alternata</i> (Fr.) Keissler (non-EU pathogenic isolates)	<i>Elsinoe</i> spp. Bitanc. and Jenk. Mendes
<i>Anisogramma anomala</i> (Peck) E. Müller	<i>Fusarium oxysporum</i> f. sp. <i>albedinis</i> (Kilian and Maire) Gordon
<i>Apiosporina morbosus</i> (Schwein.) v. Arx	<i>Guignardia piricola</i> (Nosa) Yamamoto
<i>Ceratocystis virescens</i> (Davidson) Moreau	<i>Puccinia pittieriana</i> Hennings
<i>Cercoseptoria pini-densiflorae</i> (Hori and Nambu) Deighton	<i>Stegophora ulmea</i> (Schweinitz: Fries) Sydow & Sydow
<i>Cercospora angolensis</i> Carv. and Mendes	<i>Venturia nashicola</i> Tanaka and Yamamoto

(d) Virus and virus-like organisms

Beet curly top virus (non-EU isolates)	Citrus tristeza virus (non-EU isolates)
Black raspberry latent virus	Leprosis
Blight and blight-like	Little cherry pathogen (non- EU isolates)
Cadang-Cadang viroid	Naturally spreading psorosis
Palm lethal yellowing mycoplasma	Tatter leaf virus
Satsuma dwarf virus	Witches' broom (MLO)

Annex IIB

(a) Insect mites and nematodes, at all stages of their development

<i>Anthonomus grandis</i> (Boh.)	<i>Ips cembrae</i> Heer
<i>Cephalcia lariciphila</i> (Klug)	<i>Ips duplicatus</i> Sahlberg
<i>Dendroctonus micans</i> Kugelán	<i>Ips sexdentatus</i> Börner
<i>Gilpinia hercyniae</i> (Hartig)	<i>Ips typographus</i> Heer
<i>Gonipterus scutellatus</i> Gyll.	<i>Sternochetus mangiferae</i> Fabricius
<i>Ips amitinus</i> Eichhof	

(b) Bacteria

Curtobacterium flaccumfaciens pv. *flaccumfaciens*
(Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton

Hypoxyton mammatum (Wahl.) J. Miller

Gremmeniella abietina (Lag.) Morelet

1.1.1.2 Terms of Reference: Appendix 2

List of harmful organisms for which pest categorisation is requested per group. The list below follows the categorisation included in the annexes of Directive 2000/29/EC.

Annex IAI**(a) Insects, mites and nematodes, at all stages of their development**

Group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), such as:

- | | |
|--|---|
| 1) <i>Carneocephala fulgida</i> Nottingham | 3) <i>Graphocephala atropunctata</i> (Signoret) |
| 2) <i>Draeculacephala minerva</i> Ball | |

Group of Tephritidae (non-EU) such as:

- | | |
|--|---|
| 1) <i>Anastrepha fraterculus</i> (Wiedemann) | 12) <i>Pardalaspis cyanescens</i> Bezzi |
| 2) <i>Anastrepha ludens</i> (Loew) | 13) <i>Pardalaspis quinaria</i> Bezzi |
| 3) <i>Anastrepha obliqua</i> Macquart | 14) <i>Pterandrus rosa</i> (Karsch) |
| 4) <i>Anastrepha suspensa</i> (Loew) | 15) <i>Rhacochlaena japonica</i> Ito |
| 5) <i>Dacus ciliatus</i> Loew | 16) <i>Rhagoletis completa</i> Cresson |
| 6) <i>Dacus curcurbitae</i> Coquillett | 17) <i>Rhagoletis fausta</i> (Osten-Sacken) |
| 7) <i>Dacus dorsalis</i> Hendel | 18) <i>Rhagoletis indifferens</i> Curran |
| 8) <i>Dacus tryoni</i> (Froggatt) | 19) <i>Rhagoletis mendax</i> Curran |
| 9) <i>Dacus tsuneonis</i> Miyake | 20) <i>Rhagoletis pomonella</i> Walsh |
| 10) <i>Dacus zonatus</i> Saund. | 21) <i>Rhagoletis suavis</i> (Loew) |
| 11) <i>Epochra canadensis</i> (Loew) | |

(c) Viruses and virus-like organisms

Group of potato viruses and virus-like organisms such as:

- | | |
|----------------------------------|--|
| 1) Andean potato latent virus | 5) Potato virus T |
| 2) Andean potato mottle virus | 6) non-EU isolates of potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leafroll virus |
| 3) Arracacha virus B, oca strain | |
| 4) Potato black ringspot virus | |

Group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L., such as:

- | | |
|--------------------------------------|--|
| 1) Blueberry leaf mottle virus | 8) Peach yellows mycoplasma |
| 2) Cherry rasp leaf virus (American) | 9) Plum line pattern virus (American) |
| 3) Peach mosaic virus (American) | 10) Raspberry leaf curl virus (American) |
| 4) Peach phony rickettsia | 11) Strawberry witches' broom mycoplasma |
| 5) Peach rosette mosaic virus | 12) Non-EU viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L. |
| 6) Peach rosette mycoplasma | |
| 7) Peach X-disease mycoplasma | |

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Group of *Margarodes* (non-EU species) such as:

- 1) *Margarodes vitis* (Phillipi)
- 2) *Margarodes vredendalensis* de Klerk
- 3) *Margarodes prieskaensis* Jakubski

1.1.2.3 Terms of Reference: Appendix 3

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Acleris</i> spp. (non-EU)	<i>Longidorus diadecturus</i> Eveleigh and Allen
<i>Amauromyza maculosa</i> (Malloch)	<i>Monochamus</i> spp. (non-EU)
<i>Anomala orientalis</i> Waterhouse	<i>Myndus crudus</i> Van Duzee
<i>Arrhenodes minutus</i> Drury	<i>Nacobbus aberrans</i> (Thorne) Thorne and Allen
<i>Choristoneura</i> spp. (non-EU)	<i>Naupactus leucoloma</i> Boheman
<i>Conotrachelus nenuphar</i> (Herbst)	<i>Premnotrypes</i> spp. (non-EU)
<i>Dendrolimus sibiricus</i> Tschetverikov	<i>Pseudopityophthorus minutissimus</i> (Zimmermann)
<i>Diabrotica barberi</i> Smith and Lawrence	<i>Pseudopityophthorus pruinosus</i> (Eichhoff)
<i>Diabrotica undecimpunctata howardi</i> Barber	<i>Scaphoideus luteolus</i> (Van Duzee)
<i>Diabrotica undecimpunctata undecimpunctata</i> Mannerheim	<i>Spodoptera eridania</i> (Cramer)
<i>Diabrotica virgifera zea</i> Krysan & Smith	<i>Spodoptera frugiperda</i> (Smith)
<i>Diaphorina citri</i> Kuway	<i>Spodoptera litura</i> (Fabricus)
<i>Heliothis zea</i> (Boddie)	<i>Thrips palmi</i> Karny
<i>Hirschmanniella</i> spp., other than <i>Hirschmanniella gracilis</i> (de Man) Luc and Goodey	<i>Xiphinema americanum</i> Cobb sensu lato (non-EU populations)
<i>Liriomyza sativae</i> Blanchard	<i>Xiphinema californicum</i> Lamberti and Bleve-Zacheo

(b) Fungi

<i>Ceratocystis fagacearum</i> (Bretz) Hunt	<i>Mycosphaerella larici-leptolepis</i> Ito et al.
<i>Chrysomyxa arctostaphyli</i> Dietel	<i>Mycosphaerella populorum</i> G. E. Thompson
<i>Cronartium</i> spp. (non-EU)	<i>Phoma andina</i> Turkensteen
<i>Endocronartium</i> spp. (non-EU)	<i>Phyllosticta solitaria</i> Ell. and Ev.
<i>Guignardia laricina</i> (Saw.) Yamamoto and Ito	<i>Septoria lycopersici</i> Speg. var. <i>malagutii</i> Ciccarone and Boerema
<i>Gymnosporangium</i> spp. (non-EU)	<i>Thecaphora solani</i> Barrus
<i>Inonotus weirii</i> (Murril) Kotlaba and Pouzar	<i>Trechispora brinkmannii</i> (Bresad.) Rogers
<i>Melampsora farlowii</i> (Arthur) Davis	

(c) Viruses and virus-like organisms

Tobacco ringspot virus	Pepper mild tigré virus
Tomato ringspot virus	Squash leaf curl virus
Bean golden mosaic virus	Euphorbia mosaic virus
Cowpea mild mottle virus	Florida tomato virus
Lettuce infectious yellows virus	

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex I A I I

(a) Insects, mites and nematodes, at all stages of their development

Meloidogyne fallax Karssen

Rhizoecus hibisci Kawai and Takagi

Popillia japonica Newman

(b) Bacteria

Clavibacter michiganensis (Smith) Davis et al. ssp. *Ralstonia solanacearum* (Smith) Yabuuchi et al. *sepedonicus* (Spieckermann and Kotthoff) Davis et al.

(c) Fungi

Melampsora medusae Thümen

Synchytrium endobioticum (Schilbersky) Percival

Annex I B

(a) Insects, mites and nematodes, at all stages of their development

Leptinotarsa decemlineata Say

Liriomyza bryoniae (Kaltenbach)

(b) Viruses and virus-like organisms

Beet necrotic yellow vein virus

1.2. Interpretation of the Terms of Reference

Spodoptera eridania (Cramer) is one of a number of pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether it fulfils the criteria of a quarantine pest or those of a regulated non-quarantine pest (RNQP) for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States (MSs) referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores. Based on the latest scientific consensus available (ITIS, 2019), the valid authority for this species should appear as (Stoll). Hence we regard *Spodoptera eridania* (Cramer) to be a junior synonym of *Spodoptera eridania* (Stoll).

The new Plant Health Regulation (EU) 2016/2031⁴, on the protective measures against pests of plants, will be applying from December 2019.

The regulatory status sections (3.3) of the present opinion are still based on Council Directive 2000/29/EC, as the document was adopted in November 2019.

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A literature search on *S. eridania* was conducted at the beginning of the categorisation in the ISI Web of Science bibliographic database, using the scientific name of the pest as search term. Relevant papers were reviewed, and further references and information were obtained from experts, as well as from citations within the references and grey literature.

2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the European and Mediterranean Plant Protection Organization (EPPO) Global Database (EPPO, online) and relevant publications.

⁴ Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants, amending Regulations (EU) 228/2013, (EU) 652/2014 and (EU) 1143/2014 of the European Parliament and of the Council and repealing Council Directives 69/464/EEC, 74/647/EEC, 93/85/EEC, 98/57/EC, 2000/29/EC, 2006/91/EC and 2007/33/EC. OJ L 317, 23.11.2016, pp. 4–104.

Data about the import of commodity types that could potentially provide a pathway for the pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT (Statistical Office of the European Communities).

The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network run by the Directorate General for Health and Food Safety (DG SANTÉ) of the European Commission and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. The Europhyt database manages notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the MSs and the phytosanitary measures taken to eradicate or avoid their spread.

2.2. Methodologies

The Panel performed the pest categorisation for *Spodoptera eridania*, following guiding principles and steps presented in the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018) and in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

This work was initiated following an evaluation of the EU plant health regime. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for a Union quarantine pest and for a Union RNQP in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required in accordance with the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to potentially qualify either as a quarantine pest or as a RNQP. If one of the criteria is not met, the pest will not qualify. A pest that does not qualify as a quarantine pest may still qualify as a RNQP that needs to be addressed in the opinion. For the pests regulated in the protected zones only, the scope of the categorisation is the territory of the protected zone; thus, the criteria refer to the protected zone instead of the EU territory.

It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, whereas addressing social impacts is outside the remit of the Panel.

Table 1: Pest categorisation criteria under evaluation, as defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (Articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Identity of the pest (Section 3.1)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/ presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest widely distributed within the EU? Describe the pest distribution briefly!	Is the pest present in the EU territory? If not, it cannot be a protected zone quarantine organism.	Is the pest present in the EU territory? If not, it cannot be a RNQP. (A regulated non-quarantine pest must be present in the risk assessment area).

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (Articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Regulatory status (Section 3.3)	If the pest is present in the EU but not widely distributed in the risk assessment area, it should be under official control or expected to be under official control in the near future.	The protected zone system aligns with the pest free area system under the International Plant Protection Convention (IPPC). The pest satisfies the IPPC definition of a quarantine pest that is not present in the risk assessment area (i.e. protected zone).	Is the pest regulated as a quarantine pest? If currently regulated as a quarantine pest, are there grounds to consider its status could be revoked?
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways!	Is the pest able to enter into, become established in, and spread within, the protected zone areas? Is entry by natural spread from EU areas where the pest is present possible?	Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects? Clearly state if plants for planting is the main pathway!
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?	Does the presence of the pest on plants for planting have an economic impact as regards the intended use of those plants for planting?
Available measures (Section 3.6)	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?	Are there measures available to prevent the entry into, establishment within or spread of the pest within the protected zone areas such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months (or a period longer than 24 months where the biology of the organism so justifies) after the presence of the pest was confirmed in the protected zone?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met.	A statement as to whether (1) all criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met.	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential RNQP were met, and (2) if not, which one(s) were not met.

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process, but following the agreed two-step approach, will continue only if requested by the risk managers. However, during the categorisation process, experts may identify key elements and knowledge gaps that could contribute significant uncertainty to a future assessment of risk. It would be useful to identify and highlight such gaps so that potential future requests can specifically target the major elements of uncertainty, perhaps suggesting specific scenarios to examine.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?

Yes, the identity of *S. eridania* is established and taxonomic keys are available for its identification to species level.

Spodoptera eridania (Stoll, 1781) is the current valid name (ITIS, 2019) of a highly polyphagous herbivorous moth (Lepidoptera: Noctuidae) native to the American tropics. This species has many synonyms (Todd and Poole, 1980) including the presently invalid authority name 'Cramer' (i.e. *Spodoptera eridania* (Cramer, 1784)), which is the one listed in Annex IAI of Council Directive 2000/29/EC.

3.1.2. Biology of the pest

According to Smith et al. (1997), the eggs of *S. eridania*, the southern armyworm, are laid in large batches on the leaves of the host plant, protected by a layer of grey bristles from the female abdomen. Egg development usually takes 4–8 days. Five to seven larval instars, depending on the suitability of the host (Dos Santos et al., 2005; Montezano et al., 2014), follow. Similar to other armyworms within the Noctuidae family, larvae are gregarious and remain together on the leaf for the first two instars, resulting in leaf skeletonisation. The third-instar larvae disperse and become more solitary and nocturnal. During the day they hide in the leaf litter or plant foliage and abandon their refugia to feed on the leaves at night. Mature larvae can bore into fruit (e.g. tomato in Florida; Capinera, 2018). When stressed by lack of food, larvae can eat apical portions of branches, bore into stem tissue and attack tubers close to the soil surface (Capinera, 2018). Larval development usually takes 14–18 days. As with other Noctuidae, the rate of larval development is affected by the quality of diet and prevailing temperatures; the latter also affects the adult condition. Larvae sometimes swarm and migrate to adjacent fields when food is scarce. Pupation takes place in the soil at a depth of 5–10 cm (Capinera, 2018) in a weak earthen cell and typically requires 9–13 days. Adults are nocturnal.

Spodoptera eridania is essentially a subtropical species and so a temperature of 20–25°C is optimum for development, and breeding may be continuous. The life cycle can be completed in 28–30 days, but up to 40 days is common (Capinera, 2018). There are several to many generations per year, the number depending on local conditions. Experiments in Brazil by Foerster and Dionizio (1989) showed that development at suboptimal temperatures of 17 and 30°C was 115 and 33 days, respectively. At 30°C, pupae weighed less, and survival rates were lower. In northern Florida, moths can be found throughout the year, withstanding several days of freezing weather. However, it cannot survive extended freezing and recolonises northward each year from subtropical areas (Mitchell and Tumlinson, 1994).

3.1.3. Intraspecific diversity

No reports on the intraspecific diversity of this species have been found.

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, detection and identification methods for *S. eridania* are available. An EPPO standard (EPPO/OEPP, 2015) is available.

Detection

An EPPO standard provides guidance for the identification of *S. eridania*, *S. littoralis*, *S. litura*, and *S. frugiperda* (EPPO/OEPP, 2015). Todd and Poole (1980) produced a key for armyworm moths of the genus *Spodoptera* Guenée occurring in the Americas.

Symptoms:

According to EPPO (EPPO/OEPP, 2015), 'leaf-eating is the main damage to the host plant, and in extreme cases complete defoliation may occur. The larger caterpillars are not normally seen because they are nocturnal feeders, but the first two smaller instars are gregarious and can be seen in clusters on the foliage. Initial damage to the leaves may be skeletonisation. Tomato fruits may be holed. Large larvae sometimes act as cutworms'.

Pheromone trapping:

The sex pheromone produced by female moths has been described (Teal et al., 1985), comprising of (*Z*)-9-tetradecenyl acetate (59.7%), (*Z,E*)-9,12-tetradecadienyl acetate (23.8%), (*Z*)-9-tetradecenol (8.4%), (*Z*)-11-hexadecenyl acetate (5.1%), (*Z,Z*)-9,12-tetradecadienyl acetate (3%) and (*Z,E*)-9,11-tetradecadienyl acetate (trace). This volatile blend was evaluated in the field (Mitchell and Tumlinson, 1994) and could be useful for detection and/or monitoring purposes.

Identification (based on CABI datasheet):

Egg: Subspherical in shape (0.45 × 0.35 mm) and greenish (Capinera, 2018). Laid in large groups on the plant foliage and covered with a layer of grey bristles (scales) from the abdomen of the female.

Larva: There are usually six instars (Capinera, 2018). Fully grown larvae measure 35–40 mm. Young larvae are blackish green with yellow lateral lines, but older instars are grey-brown with a dorsal row of paired black triangular spots, and subdorsal reddish lines when older; the head capsule is yellow-brown. Larvae are characterised by a prominent yellow subspiracular line which is broken by a dark (sometimes diffuse) spot on the first abdominal segment (Levy and Habeck, 1976). A full description of the larvae is given in Crumb (1956). Larvae are usually found on the lower surface of leaves and most active at night (Capinera, 2018).

Pupa: A typical noctuid pupa, shiny brown, and 19–20 mm long with rounded head and abdomen. Shiny mahogany brown, with darker head, spiracles and anterior edges of abdominal segments. Anal segment terminates in a two-spined cremaster. Pupae are usually found in the soil 5–10 cm deep (Capinera, 2018).

Adult: A sturdy grey-brown moth, wing-span 28–40 mm, forewings grey sometimes with a central dark spot or bar, hindwings white. The posterior angle of the forewing is narrowly divided from the rest of the wing by an irregular, oblique, pale band. The principal definitive features are in the male genitalia (Todd and Poole, 1980).

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

Spodoptera eridania is native to the Americas and has spread to Africa, where it was first recorded in south-eastern Nigeria in 2016. It has subsequently spread to Bénin, Cameroon and Gabon (Goergen, 2018; EPPO, online) (Figure 1). In the Americas, *S. eridania* occurs year-round in tropical and some sub-tropical regions and northwards into the USA where permanent populations occur only in the south (Florida, South Carolina, North Carolina, to southern Kansas and Texas). However, during the summer, populations fly north and can reach into New England. In the southern hemisphere, populations from Central and tropical South America fly southwards to reach Argentina and Chile during the southern hemisphere summer. Although *S. eridania* has been reported from California (Capinera, 2011; Capinera, 2014 cited in CDFA, 2016), the California Department of Food and Agriculture states that it has never been found in the environment of California but intercepted four times on bell peppers, cilantro, tree fern, and *Asparagus sprengeri* from Florida (CDFA, 2016).

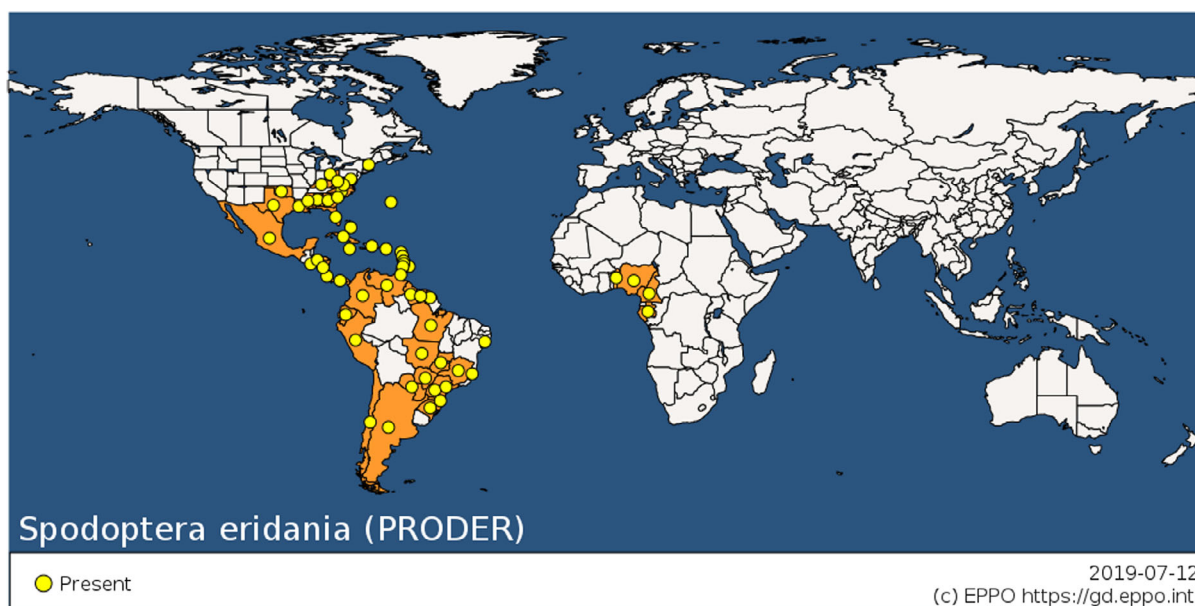


Figure 1: Global distribution map for *S. eridania* (extracted from the EPPO Global Database accessed on 12 July 2019)

3.2.2. Pest distribution in the EU

Spodoptera eridania is not known to be present in the EU. According to EPPO (online), Slovenia and The Netherlands NPPO report *S. eridania* as absent and Denmark reports it as intercepted only.

Is the pest present in the EU territory? If present, is the pest widely distributed within the EU?

No, *S. eridania* is not known to be present in the EU

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

S. eridania is listed in Council Directive 2000/29/EC. Details are presented in Table 2.

Table 2: *Spodoptera eridania* in Council Directive 2000/29/EC

Annex I Part A	Harmful organisms whose introduction into, and spread within, all member states shall be banned
Section I	Harmful organisms not known to occur in any part of the community and relevant for the entire community
(a)	Insects, mites and nematodes, at all stages of their development
	Species
21	<i>Spodoptera eridania</i> (Cramer)

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

According to Montezano et al. (2014), *S. eridania* has been found on at least 202 natural host plants in 58 botanical families, including both cultivated and non-crop plants that could be considered as weeds (Appendix A). Compared to its close relative *S. frugiperda* Walker, for which 186 host plants have been cited with a clear preference for Poaceae (66 species) (Casmuz et al., 2010; EFSA PLH Panel, 2017), such a preference for any plant family is not found in *S. eridiana* (Montezano et al., 2014). The same authors report the occurrence of this species in crops of regional importance, which highlights the versatility and ability of this species to rapidly adapt in various regions of the Americas,

feeding on cultivated plants including alfalfa, bean, beet, cabbage, cassava, cotton, maize, potato, soybean, sweet potato, and tomato, but also exploiting weeds as alternative hosts used by females for oviposition and by larger larvae when migrating.

The existing plant health directive does not explicitly list all *S. eridania* hosts. However, as it is listed in Annex IAI, its introduction and spread in the EU is banned irrespective of what it may be found on. Some host plants are listed in the import prohibitions of Annex III or in specific requirements in Annex IV of Council Directive 2000/29/EC.

3.4.2. Entry

Is the pest able to enter into the EU territory?

Yes, plants for planting, cut branches, cut flowers, fruit and soil/growing media could provide pathways for entry. The soil/growing medium pathway is closed and the remaining pathways are partly regulated.

S. eridania is a polyphagous species and its different life stages could use different pathways to enter the EU:

- Eggs and larvae:
 - Plants for planting (excluding seeds)
 - Cut branches
 - Cut flowers
 - Fruit
- Pupae:
 - Soil/growing medium from infested fields, and
- Adults:
 - Hitchhikers, as already observed (ref to Denmark, EPPO GD; Europhyt).

The soil/growing medium pathway can be considered as closed, as soil from *S. eridania* infested countries is banned from entering into the EU (Annex IIIA 14). The plants for planting (excluding seeds), cut branches, cut flowers, and fruit pathways are not specifically regulated although as an Annex IAI pest, the entry of *S. eridania* into the EU is prohibited regardless of the commodity where they are found. In the future, following the implementation of the Plant Health Regulation (EC 2016/2031), consignments of almost all fruit and vegetable will require a phytosanitary certificate indicating that they have been inspected and are free from harmful organisms before entry into the EU.

According to the Europhyt database, between 2005 and 2019, *S. eridania* has been intercepted 37 times by the Netherlands NPPO. Two of these interceptions refer to Mexico (where it was found on *Rubus ulmifolius* and *Rubus* spp.), two to Costa Rica (where it was found on *Dracaena marginata* and *Schefflera arboricola*), and the remaining 33 to Suriname, where it was found on *Amaranthus dubius*, *Apium graveolens*, *Capsicum* sp., *Solanum macrocarpon*, *Solanum melongena*, *Phaseolus* sp., and *Vigna* sp.) (Figure 2). The lack of specific CN codes for most of the plants on which *S. eridania* has been intercepted means that it is not possible to determine the volume of these host plants imported into EU from countries where *S. eridania* occurs. Nevertheless, for the purposes of this categorisation, the fact that this pest has been repeatedly intercepted indicates that pathways for entry exist.

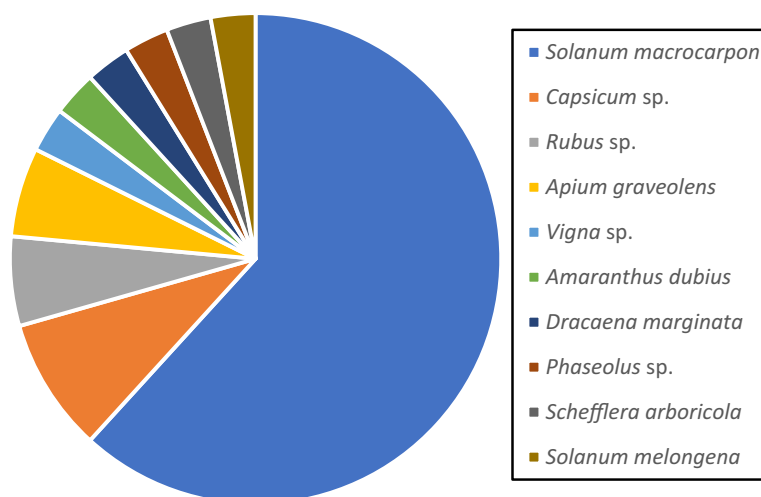


Figure 2: Relative frequency of *S. eridania* on different plant species where it has been intercepted when entering into the EU (n = 37) (Source: Europhyt, March 2005–February 2019)

3.4.3. Establishment

Is the pest able to become established in the EU territory?

Yes, biotic and abiotic conditions are conducive for establishment of *S. eridania* in some parts of the EU where potential hosts are either cultivated or occur as weeds.

3.4.3.1 EU distribution of main host plants

Smith et al. (1997) and CABI (2018) note that many potential crop hosts are available to *S. eridania* in the EU, especially those in the southern member states. These authors suggest field tomatoes and sugarbeet could be especially vulnerable, as well as a wide range of other vegetables and flowers, including those grown in glasshouses. EU crop areas for tomatoes and beetroots (sugarbeet data is not available at Eurostat) are presented in Tables 3 and 4.

Table 3: EU crop area (1000 ha) for tomatoes (2014–2019). Source: Eurostat (code: V3100; data extracted: 7/7/19)

GEO/TIME	2014	2015	2016	2017	2018	2019
European Union – 28 countries	248.09	254.43	247.00	241.07	239.70	:
Austria	0.19	0.19	0.18	0.18	0.2	0.19
Belgium	0.51	0.51	0.51	0.52	0.52	:
Bulgaria	3.59	3.28	4.2	5.01	4.52	4.00
Croatia	0.32	0.42	0.37	0.45	0.4	0.45
Cyprus	0.21	0.27	0.22	0.26	0.26	0.28
Czech Republic	0.28	0.2	0.34	0.24	0.30	0.30
Denmark	0.04	0.03	0.03	0.03	0.03	0.03
Estonia	0.00	0.00	0.01	0.00	0.00	:
Finland	0.11	0.11	0.11	0.11	0.10	0.09
France	5.83	5.69	5.65	5.75	5.74	4.65
Germany	0.33	0.33	0.34	0.37	0.40	:
Greece	17.26	15.25	14.01	13.32	13.33	14.48
Hungary	1.88	2.26	2.08	2.19	2.50	2.50
Ireland	0.01	0.01	0.01	0.01	0.01	0.01
Italy	103.11	107.18	96.78	92.67	100.90	:
Latvia	0.00	0.00	0.00	0.00	0.00	0.00
Lithuania	0.54	0.49	0.57	0.55	0.57	0.60

GEO/TIME	2014	2015	2016	2017	2018	2019
Luxembourg	0.00	0.00	0.00	0.00	0.00	:
Malta	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	1.78	1.76	1.78	1.79	1.79	:
Poland	13.50	13.80	12.42	12.64	13.11	:
Portugal	18.46	18.66	20.85	20.87	15.83	15.84
Romania	24.43	24.84	22.71	22.21	22.06	22.95
Slovakia	0.51	0.57	0.68	0.60	0.59	:
Slovenia	0.23	0.19	0.21	0.20	0.19	:
Spain	54.75	58.13	62.72	60.85	56.12	56.06
Sweden	0.04	0.04	0.04	0.04	0.04	0.04
United Kingdom	0.20	0.23	0.20	0.20	0.18	0.19

Table 4: EU crop area (1000 ha) for beetroots (2014–2019). Source: Eurostat (V4300; data extracted: 7/7/2019)

GEO/TIME	2014	2015	2016	2017	2018	2019
European Union - 28 countries	:	:	23.38	23.51	:	:
Austria	0.15	0.11	0.15	0.15	0.14	:
Belgium	0.00	0.00	0.00	0.05	0.04	:
Bulgaria	0.00	0.15	0.11	0.10	0.04	0.00
Croatia	0.11	0.14	0.14	0.14	0.16	:
Cyprus	0.03	0.03	0.03	0.03	0.03	:
Czech Republic	0.00	0.00	0.00	0.00	0.14	:
Denmark	:	0.31	0.28	0.27	0.27	:
Estonia	0.20	0.20	0.24	0.25	0.21	:
Finland	0.43	0.42	0.43	0.42	0.46	:
France	2.88	2.87	3.03	3.12	3.1	:
Germany	1.69	1.49	1.67	1.74	1.83	:
Greece	0.64	0.59	0.55	0.58	0.60	:
Hungary	0.21	0.32	0.38	0.33	0.33	:
Ireland	0.00	0.00	0.00	0.00	0.00	0.00
Italy	:	:	0.85	0.88	:	:
Latvia	0.40	0.40	0.40	0.20	0.30	:
Lithuania	1.73	1.62	1.84	1.76	2.09	:
Luxembourg	:	:	0.01	0.01	0.01	:
Malta	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	0.00	0.66	0.74	0.95	0.88	:
Poland	11.30	11.30	10.24	10.37	10.55	:
Portugal	0.15	0.20	0.17	0.14	0.22	:
Romania	0.20	0.16	0.16	0.15	0.14	0.00
Slovakia	0.00	0.06	0.07	0.09	0.04	0.00
Slovenia	:	0.12	0.17	0.16	0.16	:
Spain	:	1.00	1.31	1.13	1.16	:
Sweden	0.46	0.42	0.44	0.5	0.49	:
United Kingdom	2.00	1.70	0.00	0.00	0.00	:

3.4.3.2 Climatic conditions affecting establishment

Although *S. eridania* can be widely distributed in the Americas (Figure 1), USA populations at latitudes higher than North Carolina are considered vagrant, which reduces the number of Köppen–Geiger temperate climate zones where this herbivore is permanently established (Figure 3). Hence, *S. eridania* is mostly established in areas of the Americas and the Gulf of Guinea where tropical or

some sub-tropical Köppen–Geiger climate types occur (Figures 3 and 4). As a consequence, the establishment of *S. eridania* in areas with a climate type matching EU is quite limited and may be restricted to Cfa (warm temperate climate, fully humid, hot summer), which represents 6.31% of EU area in Bulgaria, France, Italy, Romania, and Spain (MacLeod and Korycinska, 2019). Whether *S. eridania* could establish under protected cultivation at higher latitudes in the EU remains unknown but is considered likely by EPPO (Smith et al., 1997).

Mitchell and Tumlinson (1994) note that *S. eridania* cannot survive extended periods of freezing temperatures. The EFSA PLH Panel (2019) provides a map of the mean number of annual frost days in Europe, 1988–2017. It shows that southern coastal areas of Portugal, Spain, France, Italy, Greece and Cyprus normally remain frost free year round.

We assume that climatic conditions in the EU will not limit the ability of *S. eridania* to establish.

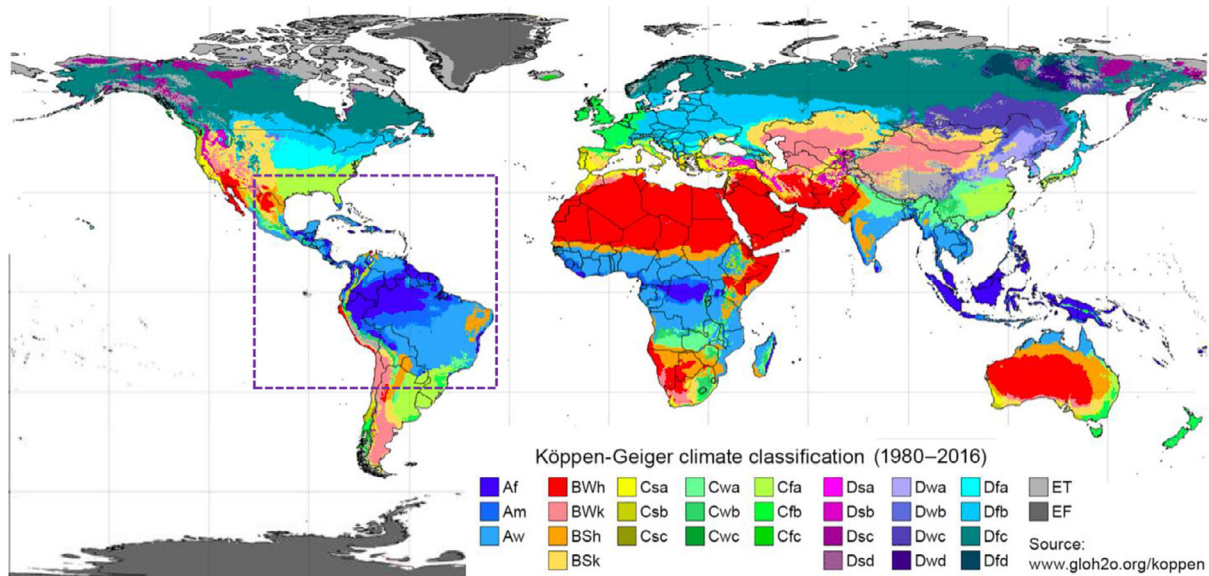


Figure 3: Köppen–Gieger climate type zones (Beck et al., 2019). In the Americas, *S. eridania* is established year round in tropical areas (within dotted rectangle, climates Af, Am, Aw), which do not occur in the EU (MacLeod and Korycinska, 2019)

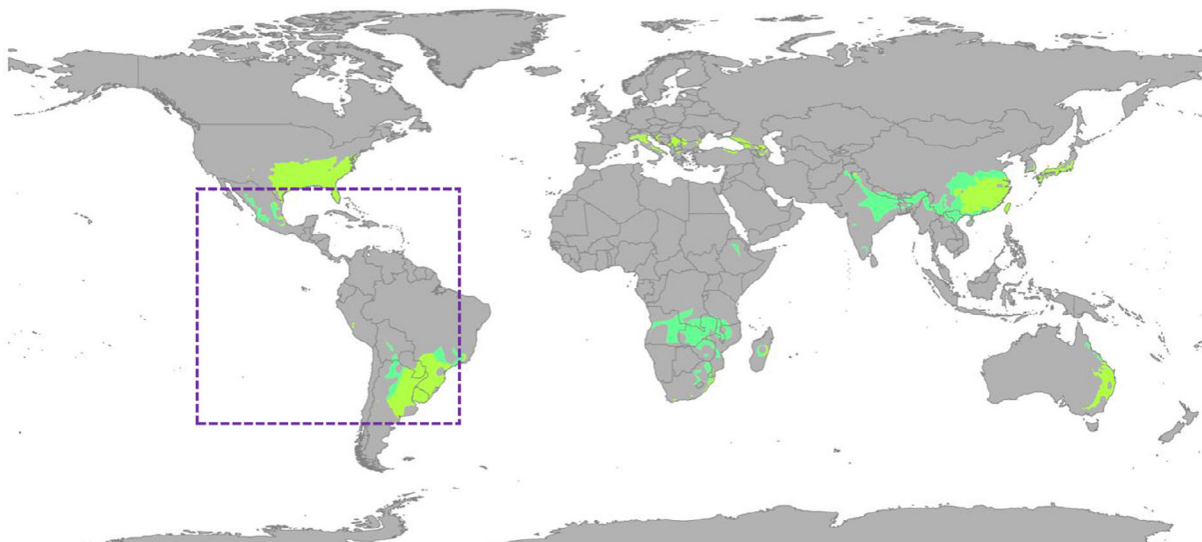


Figure 4: World occurrence of Köppen–Geiger climate types Cfa (humid subtropical, lighter green) and Cwa (dry winter, humid sub-tropical, blueish green) (Beck et al., 2019). In the Americas, *S. eridania* occurs (dotted rectangle) in areas with temperate Cfa climate type, which can be found in southern EU (6.31% of EU area, MacLeod and Korycinska, 2019)

3.4.4. Spread

Is the pest able to spread within the EU territory following establishment?

Yes, adults can fly. However, *S. eridania* seems not to engage in long-distance migrations.

RNQPs: Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects?

No, spread is not mainly via plants for planting. Adults are strong fliers. Human-assisted dispersal could play a major role in spread.

According to CABI (2018), in the Americas, *S. eridania* does not engage in long-distance migrations. Human-assisted dispersal is suspected for long distance movement as in the case of the colonisation of the Galápagos Islands (Ecuador) and is the likely cause of spread into Africa.

3.5. Impacts

Would the pests' introduction have an economic or environmental impact on the EU territory?

Yes, the introduction of *S. eridania* would most probably have an economic impact in the EU through qualitative and quantitative effects on agricultural production.

RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?⁵

Yes, should *S. eridania* be present on plants for planting, an economic impact on their intended use would be expected.

Spodoptera eridania is usually only a minor pest on most crops in the New World (CABI, 2018). Since most damage is caused by leaf-eating, light infestations on field crops can be tolerated. However, locally, e.g. tomatoes and sweet potatoes in Florida, it can cause considerable economic damage (Mitchell and Tumlinson, 1994). In addition, other commercial vegetable and flower crops can be seriously affected. *S. eridania* has demonstrated a propensity to broaden its host range and include sunflower, often defoliating plants to a degree that yields are greatly reduced (Mitchell, 1984). Moreover, according to CDFA (2016), larvae of *S. eridania* may disfigure nursery stock with feeding damage and pupate in the associated soil, reducing the value of nursery stock and also of urban and backyard ornamental plants.

3.6. Availability and limits of mitigation measures

Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?

Yes, the existing measures (see Sections 3.3 and 3.4.2) can mitigate the risks of entry, establishment, and spread within the EU. As a pest listed in Annex IAI, its introduction and spread in the EU is banned irrespective of what it may be found on.

RNQPs: Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?

Yes, sourcing plants and plant parts from Pest Free Areas (PFA) would mitigate the risk.

3.6.1. Identification of additional measures

Phytosanitary measures are currently applied to soil. Some host plants are listed in the import prohibitions of Annex III or in specific requirements in Annex IV of Council Directive 2000/29/EC. Although, as a pest included in Annex IAI, its introduction and spread in the EU is banned, many potential hosts are not explicitly listed in this directive and therefore, not explicitly regulated (see Sections 3.3 and 3.4.2).

3.6.1.1. Additional control measures

Potential additional control measures are listed in Table 5.

⁵ See Section 2.1 on what falls outside EFSA's remit.

Table 5: Selected control measures (a full list is available in EFSA PLH Panel, 2018) for pest entry/establishment/spread/impact in relation to currently unregulated hosts and pathways. Control measures are measures that have a direct effect on pest abundance

Information sheet title (with hyperlink to information sheet if available)	Control measure summary	Risk component (entry/establishment/spread/impact)
Growing plants in isolation	Description of possible exclusion conditions that could be implemented to isolate the crop from pests and if applicable relevant vectors. E.g. a dedicated structure such as glass or plastic greenhouses. According to CABI (2018), plants used for production should come from locations found free from the pest during the previous 3 months	Entry, spread, impact
Chemical treatments on consignments or during processing	Use of chemical compounds that may be applied to plants or to plant products after harvest, during process or packaging operations and storage. The treatments addressed in this information sheet are: a) fumigation; b) spraying/dipping pesticides; c) surface disinfectants; d) process additives; e) protective compounds. Plant cuttings of certain host plants may be treated by being held at low temperatures (< 1.7°C) for 2–4 days, followed by fumigation (CABI, 2018)	Entry, spread, impact
Cleaning and disinfection of facilities, tools and machinery	The physical and chemical cleaning and disinfection of facilities, tools, machinery, transport means, facilities and other accessories (e.g. boxes, pots, pallets, palox, supports, hand tools). The measures addressed in this information sheet are: washing, sweeping and fumigation	Entry, spread, impact
Soil treatment	The control of soil organisms by chemical and physical methods listed below: a) fumigation; b) heating; c) solarisation; d) flooding; e) soil suppression; f) augmentative biological control; g) biofumigation As a pest which passes part of its life cycle in the soil, these measures could impact its populations	Impact
Physical treatments on consignments or during processing	This information sheet deals with the following categories of physical treatments: irradiation/ionisation; mechanical cleaning (brushing, washing); sorting and grading, and; removal of plant parts (e.g. debarking wood). This information sheet does not address: heat and cold treatment (information sheet 1.14); roguing and pruning (information sheet 1.12)	Entry, spread, impact
Controlled atmosphere	Treatment of plants by storage in a modified atmosphere (including modified humidity, O ₂ , CO ₂ , temperature, pressure)	Entry, spread, impact
Waste management	Treatment of the waste (deep burial, composting, incineration, chipping, production of bioenergy, etc.) in authorised facilities and official restriction on the movement of waste	Entry, spread, impact
Conditions of transport	Specific requirements for mode and timing of transport of commodities to prevent escape of the pest and/or contamination. a) physical protection of consignment; b) timing of transport/trade	Entry, spread, impact
Chemical treatments on crops including reproductive material	–	Entry, spread, impact
Use of resistant and tolerant plant species/varieties	Resistant plants are used to restrict the growth and development of a specified pest and/or the damage they cause when compared to susceptible plant varieties under similar environmental conditions and pest pressure. It is important to distinguish resistant from tolerant species/varieties. Some soybean genotypes exhibit resistance to <i>S. eridania</i> (Souza et al., 2014)	Spread, impact

Information sheet title (with hyperlink to information sheet if available)	Control measure summary	Risk component (entry/ establishment/ spread/ impact)
Biological control and behavioural manipulation	Other pest control techniques not covered by 1.03 and 1.13. Biological control (macro- and micro-BC (e.g. <i>B. thuringiensis</i> , endosymbionts) widely covered in different references, e.g. CABI, 2018)	Spread, impact
Post-entry quarantine and other restrictions of movement in the importing country	This information sheet covers post-entry quarantine of relevant commodities; temporal, spatial and end-use restrictions in the importing country for import of relevant commodities; Prohibition of import of relevant commodities into the domestic country. Relevant commodities are plants, plant parts and other materials that may carry pests, either as infection, infestation or contamination	Entry

3.6.1.2. Additional supporting measures

Potential additional supporting measures are listed in Table 6.

Table 6: Selected supporting measures (a full list is available in EFSA PLH Panel, 2018) in relation to currently unregulated hosts and pathways. Supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance.

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/ establishment/ spread/ impact)
Inspection and trapping	Inspection is defined as the official visual examination of plants, plant products or other regulated articles to determine if pests are present or to determine compliance with phytosanitary regulations (ISPM 5). The effectiveness of sampling and subsequent inspection to detect pests may be enhanced by including trapping and luring techniques	Entry, spread, impact
Laboratory testing	Examination, other than visual, to determine if pests are present using official diagnostic protocols. Diagnostic protocols describe the minimum requirements for reliable diagnosis of regulated pests	Entry, impact
Certified and approved premises	Mandatory/voluntary certification/approval of premises is a process including a set of procedures and of actions implemented by producers, conditioners and traders contributing to ensure the phytosanitary compliance of consignments. It can be a part of a larger system maintained by a National Plant Protection Organization in order to guarantee the fulfilment of plant health requirements of plants and plant products intended for trade. Key property of certified or approved premises is the traceability of activities and tasks (and their components) inherent the pursued phytosanitary objective. Traceability aims to provide access to all trustful pieces of information that may help to prove the compliance of consignments with phytosanitary requirements of importing countries	Entry, spread, impact
Delimitation of Buffer zones	ISPM 5 defines a buffer zone as 'an area surrounding or adjacent to an area officially delimited for phytosanitary purposes in order to minimize the probability of spread of the target pest into or out of the delimited area, and subject to phytosanitary or other control measures, if appropriate' (ISPM 5). The objectives for delimiting a buffer zone can be to prevent spread from the outbreak area and to maintain a pest free production place, site or area	Entry, establishment, spread, impact

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/ establishment/ spread/ impact)
Sampling	According to ISPM 31, it is usually not feasible to inspect entire consignments, so phytosanitary inspection is performed mainly on samples obtained from a consignment. It is noted that the sampling concepts presented in this standard may also apply to other phytosanitary procedures, notably selection of units for testing. For inspection, testing and/or surveillance purposes the sample may be taken according to a statistically based or a non-statistical sampling methodology	Entry, establishment, spread, impact
Phytosanitary certificate and plant passport	An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements (ISPM 5) a) export certificate (import) b) plant passport (EU internal trade)	Entry, spread, impact
Certification of reproductive material (voluntary/ official)	–	Entry, spread, impact
Surveillance	–	Entry, spread, impact

3.6.1.3. Biological or technical factors limiting the effectiveness of measures to prevent the entry, establishment and spread of the pest

- Eggs and young larvae, especially if prevalence is low, may remain undetected.
- The extreme polyphagy of this species means that existing lists of host plants may not be comprehensive.

3.6.1.4. Biological or technical factors limiting the ability to prevent the presence of the pest on plants for planting

- High mobility of the insect that may disperse on many host plants for planting.

3.7. Uncertainty

By its very nature of a categorisation being a rapid process, uncertainty is rated high. However, the uncertainties in this case are insufficient to affect the conclusions of the categorisation.

4. Conclusions

S. eridania satisfies the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest. *S. eridania* does not meet the criteria of occurring in the EU nor plants for planting being the principal means of spread for it to be regarded as a potential Union RNQP (Table 7).

Table 7: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pests (Section 3.1)	The identity of <i>S. eridania</i> is established and taxonomic keys are available for its identification to species level.	The identity of <i>S. eridania</i> is established and taxonomic keys are available for its identification to species level.	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Absence/presence of the pest in the EU territory (Section 3.2)	<i>S. eridania</i> is not known to be present in the EU.	<i>S. eridania</i> is not known to be present in the EU. Therefore, it does not fulfil this criterion to be regulated as a regulated non-quarantine pest (RNQP).	
Regulatory status (Section 3.3)	The pest is currently listed in Annex IAI of 2000/29 EC.	There are no grounds to consider its status as a quarantine pest is to be revoked.	
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	The pest could enter into, become established in, and spread within, the EU territory. The main pathways are: <ul style="list-style-type: none"> Plants for planting (excluding seeds) Cut branches Cut flowers Fruit Imported from infested areas	Although adults can fly, natural spread is not considered its main dispersal mode but human-assisted transport.	Pathway volumes unknown
Potential for consequences in the EU territory (Section 3.5)	The pests' introduction would most probably have an economic impact in the EU.	Should <i>S. eridania</i> be present on plants for planting, an economic impact on its intended use would be expected.	
Available measures (Section 3.6)	There are measures available to prevent the entry into, establishment within or spread of the pest within the EU (i.e. sourcing plants from PFA).	There are measures available to prevent pest presence on plants for planting (i.e. sourcing plants from PFA, Pest Free Place of Production (PFPP)).	
Conclusion on pest categorisation (Section 4)	All criteria assessed by EFSA above for consideration as a potential quarantine pest are met with no uncertainties.	The criterion of the pest being present in the EU territory, which is a pre-requisite for consideration as a potential regulated non-quarantine, is not met. The criterion of plants for planting being the main means of spread is not met either.	
Aspects of assessment to focus on/scenarios to address in future if appropriate			

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Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 1995, 2017)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017)
Measures	Control (of a pest) is defined in ISPM 5 (FAO 2017) as 'Suppression, containment or eradication of a pest population' (FAO, 1995). Control measures are measures that have a direct effect on pest abundance. Supporting measures are organisational measures or procedures supporting the choice of appropriate Risk Reduction Options that do not directly affect pest abundance.
Pathway	Any means that allows the entry or spread of a pest (FAO, 2017)
Phytosanitary measures	Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests (FAO, 2017)
Protected zones (PZ)	A Protected zone is an area recognised at EU level to be free from a harmful organism, which is established in one or more other parts of the Union.
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO, 2017)
Regulated non-quarantine pest	A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (FAO, 2017)
Risk reduction option (RRO)	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A RRO may become a phytosanitary measure, action or procedure according to the decision of the risk manager
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO, 2017)

Abbreviations

EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MS	Member State
PFA	Pest Free Areas
PFPP	Pest Free Place of Production
PLH	EFSA Panel on Plant Health
PZ	Protected Zone
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Appendix A – List of natural host plants of *Spodoptera eridania* larvae recorded in several bibliographic sources and gathered in Montezano et al., 2014

No	Plant family	Plant name	Common name
1	Acanthaceae	<i>Odontonema strictum</i>	
2	Acanthaceae	<i>Sanchezia speciosa</i>	
3	Acanthaceae	<i>Teliostachya alopecuroidea</i>	
4	Amaranthaceae	<i>Achyranthes aspera</i>	Devil's horsewhip
5	Amaranthaceae	<i>Amaranthus deflexus</i>	Red-root amaranth
6	Amaranthaceae	<i>Amaranthus hybridus</i>	Slim amaranth
7	Amaranthaceae	<i>Amaranthus quitensis</i>	
8	Amaranthaceae	<i>Amaranthus retroflexus</i>	Rough pigweed
9	Amaranthaceae	<i>Amaranthus spinosus</i>	Spiny amaranth
10	Amaranthaceae	<i>Amaranthus viridis</i>	
11	Amaranthaceae	<i>Celosia cristata</i>	Cockscomb
12	Amaranthaceae	<i>Spinacia oleracea</i>	Spinach
13	Anacardiaceae	<i>Schinus terebentifolium Raddi</i>	Brazilian peppertree
14	Apiaceae	<i>Apium graveolens</i>	Celery
15	Apiaceae	<i>Daucus carota</i>	Carrot
16	Apiaceae	<i>Hydrocotyle ranunculoides</i>	Water pennywort
17	Apocynaceae	<i>Nerium oleander</i>	Oleander
18	Araceae	<i>Xanthosoma</i>	
19	Araliaceae	<i>Didymopanax morototoni</i>	
20	Asteraceae	<i>Artemisia absinthium</i>	Absinthium
21	Asteraceae	<i>Baccharis trimera</i>	Carqueja
22	Asteraceae	<i>Bidens pilosa</i>	Hairy beggarticks
23	Asteraceae	<i>Chrysanthemum morifolium</i>	Ramat Chrysanthemum
24	Asteraceae	<i>Clibadium erosum</i>	
25	Asteraceae	<i>Conyza bonariensis</i>	Weed
26	Asteraceae	<i>Conyza canadensis</i>	Hogweed
27	Asteraceae	<i>Eclipta prostrata</i>	Eclipta
28	Asteraceae	<i>Erechtites valerianaefolia</i>	Brazilian fireweed
29	Asteraceae	<i>Gerbera jamesonii</i>	Gerbera daisy
30	Asteraceae	<i>Helianthus sp.</i>	
31	Asteraceae	<i>Helianthus annuus</i>	Sunflower
32	Asteraceae	<i>Lactuca sativa</i>	Lattuce
33	Asteraceae	<i>Mikania cordifolia</i>	Willdenow Guaco
34	Asteraceae	<i>Neurolaena lobata</i>	Cassini
35	Asteraceae	<i>Pseudoelephantopus spicatus</i>	Weed
36	Asteraceae	<i>Sonchus sp.</i>	
37	Asteraceae	<i>Sonchus oleraceus</i>	Common sowthistle
38	Asteraceae	<i>Taraxacum officinale</i>	Blowball
39	Asteraceae	<i>Vernonia tweediana</i>	Ironweed
40	Balsaminaceae	<i>Impatiens sultani</i>	Balsamine
41	Balsaminaceae	<i>Impatiens wallerana</i>	
42	Begoniaceae	<i>Begonia rex</i>	Begonia
43	Brassicaceae	<i>Coronopus didymus</i>	Lesser swinecress
44	Brassicaceae	<i>Brassica napus var. oleifera</i>	Colza
45	Brassicaceae	<i>Brassica nigra</i>	Black mustard
46	Brassicaceae	<i>Brassica oleracea var. capitata</i>	Cabbage

No	Plant family	Plant name	Common name
47	Brassicaceae	<i>Brassica oleracea</i> var. <i>viridis</i>	Collard
48	Brassicaceae	<i>Eruca sativa</i>	Garden rocket
49	Brassicaceae	<i>Nasturium officinale</i>	Brown Watercress
50	Campanulaceae	<i>Lobelia portoricensis</i>	
51	Caprifoliaceae	<i>Lonicera japonica</i>	Japanese honeysuckle
52	Caricaceae	<i>Carica papaya</i>	Papaya
53	Caryophyllaceae	<i>Dianthus caryophyllus</i>	Carnation
54	Cecropiaceae	<i>Cecropia peltata</i>	Trumpet tree
55	Chenopodiaceae	<i>Beta vulgaris</i>	Beet
56	Chenopodiaceae	<i>Beta vulgaris</i> var. <i>vulgaris</i>	Sugar beet
57	Chenopodiaceae	<i>Beta vulgaris</i> var. <i>cicla</i>	Swiss chard
58	Chenopodiaceae	<i>Chenopodium quinoa</i>	Quinoa
59	Commelinaceae	<i>Commelina diffusa</i>	
60	Commelinaceae	<i>Tripogandra serrula</i>	
61	Convolvulaceae	<i>Calonyctium speciosum</i>	Good night
62	Convolvulaceae	<i>Ipomoea batatas</i>	Sweet potato
63	Convolvulaceae	<i>Ipomoea grandiflora</i>	Moonflower
64	Convolvulaceae	<i>Ipomea purpurea</i>	Handbell
65	Convolvulaceae	<i>Ipomea tiliacea</i>	
66	Cucurbitaceae	<i>Cayaponia americana</i>	
67	Cucurbitaceae	<i>Cayaponia racemosa</i>	
68	Cucurbitaceae	<i>Cucumis melo</i>	Melon
69	Cucurbitaceae	<i>Cucumis sativus</i>	Cucumber
70	Cucurbitaceae	<i>Cucurbita maxima</i>	Squash
71	Cucurbitaceae	<i>Citrullus lanatus</i> var. <i>lanatus</i>	Watermelon
72	Cucurbitaceae	<i>Sechium edule</i>	Chayote
73	Dioscoreaceae	<i>Dioscorea polygonoides</i>	Dioscorea
74	Dioscoreaceae	<i>Rajania cordata</i>	
75	Ericaceae	<i>Vaccinium macrocarpum</i>	Cranberry
76	Escrofulariaceae	<i>Antirrhinum majus</i>	Snapdragons
77	Euphorbiaceae	<i>Aleurites fordii</i>	Tung tree
78	Euphorbiaceae	<i>Manihot esculenta</i>	Cassava
79	Euphorbiaceae	<i>Ricinus communis</i>	Castor bean
80	Euphorbiaceae	<i>Sapium jamaicense</i>	
81	Fabaceae	<i>Arachis hypogaea</i>	Peanuts
82	Fabaceae	<i>Centrosema pubescens</i>	Spurred butterfly pea
83	Fabaceae	<i>Cicer arietinum</i>	Chick pea
84	Fabaceae	<i>Crotalaria breviflora</i>	Shortflower rattlebox
85	Fabaceae	<i>Crotalaria spectabilis</i>	Showy rattlebox
86	Fabaceae	<i>Desmodium adscendens</i>	Tick clover
87	Fabaceae	<i>Glycine max</i>	Soybean
88	Fabaceae	<i>Leucaena leucocephala</i>	
89	Fabaceae	<i>Medicago sativa</i>	Alfalfa
90	Fabaceae	<i>Mimosa pudica</i>	Sensitive plant
91	Fabaceae	<i>Mimosa scabrella</i>	Bracatinga
92	Fabaceae	<i>Mucuna pruriens</i> var. <i>utilis</i>	Velvet bean
93	Fabaceae	<i>Phaseolus lunatus</i>	Lima bean
94	Fabaceae	<i>Phaseolus polystachios</i>	Thicket bean
95	Fabaceae	<i>Phaseolus vulgaris</i>	beans
96	Fabaceae	<i>Pisum sativum</i>	peas

No	Plant family	Plant name	Common name
97	Fabaceae	<i>Trifolium</i> sp.	Clovers
98	Fabaceae	<i>Vicia faba</i>	Faba bean
99	Fabaceae	<i>Vignum unguiculata</i>	Cowpea
100	Geraniaceae	<i>Geranium</i> sp.	Geranium
101	Geraniaceae	<i>Pelargonium hortorum</i>	Geranium
102	Lamiaceae	<i>Lavandula angustifolia</i>	True lavender
103	Lamiaceae	<i>Melissa officinalis</i>	Common balm
104	Lamiaceae	<i>Mentha arvensis</i> var. <i>piperacens</i>	
105	Lamiaceae	<i>Mentha piperita</i>	
106	Lamiaceae	<i>Mentha spicata</i>	Garden mint
107	Lamiaceae	<i>Mentha</i> sp.	Peppermint
108	Lauraceae	<i>Ocotea</i> sp.	
109	Lauraceae	<i>Persea americana</i>	Avocado
110	Liliaceae	<i>Allium cepa</i>	Onion
111	Liliaceae	<i>Allium fistulosum</i>	Green Onion
112	Liliaceae	<i>Allium sativum</i>	Garlic
113	Liliaceae	<i>Asparagus officinalis</i>	Asparagus
114	Linaceae	<i>Linum usitatissimum</i>	Flax
115	Litraceae	<i>Lagerstroemia indica</i>	Crape myrtle
116	Lomariopsidaceae	<i>Elaphoglossum</i> sp.	
117	Malvaceae	<i>Abelmoschus esculentus</i>	Okra
118	Malvaceae	<i>Althaea rosea</i>	Hollyhock
119	Malvaceae	<i>Gossypium herbacium</i>	Cotton
120	Malvaceae	<i>Hibiscus cannabinus</i>	Brown Indianhemp
121	Malvaceae	<i>Hibiscus rosa-sinensis</i>	
122	Malvaceae	<i>Malva parviflora</i>	Mallow
123	Malvaceae	<i>Pavonia fruticosa</i>	
124	Malvaceae	<i>Sida rhombifolia</i>	Arrow-leaf sida
125	Melastomataceae	<i>Heterotrichum cymosum</i>	
126	Moraceae	<i>Morus alba</i>	Mulberry
127	Myrtaceae	<i>Eucalyptus</i> sp.	Eucalyptus
128	Myrtaceae	<i>Psidium guajava</i>	Apple guava
129	Ochnaceae	<i>Sauvagesia erecta</i>	
130	Onagraceae	<i>Ludwigia</i> sp.	
131	Papaveraceae	<i>Sanguinaria canadensis</i>	Bloodroot
132	Passifloraceae	<i>Passiflora edulis</i>	Passion-flower
133	Passifloraceae	<i>Passiflora sexflora</i>	
134	Phyllanthaceae	<i>Phyllanthus urinaria</i>	Chamber bitter
135	Phytolaccaceae	<i>Phytolacca americana</i>	
136	Phytolaccaceae	<i>Phytolacca decandra</i>	
137	Phytolaccaceae	<i>Phytolacca dioica</i>	
138	Phytolaccaceae	<i>Phytolacca rigida</i>	Pokeweed
139	Phytolaccaceae	<i>Phytolacca rivinoides</i>	
140	Phytolaccaceae	<i>Phytolacca thyrsoiflora</i>	Pokeweed
141	Piperaceae	<i>Lepianthes umbellatum</i>	Rafinesque
142	Plantaginaceae	<i>Plantago major</i>	Common plantain
143	Poaceae	<i>Cynodon nlemfuensis</i>	African Bermudagrass
144	Poaceae	<i>Digitaria ischaemum</i>	Small crabgrass
145	Poaceae	<i>Digitaria sanguinalis</i>	Large crabgrass
146	Poaceae	<i>Ichnanthus pallens</i>	

No	Plant family	Plant name	Common name
147	Poaceae	<i>Lolium perene</i>	Ryegrass
148	Poaceae	<i>Melinis minutiflora</i>	Molassesgrass
149	Poaceae	<i>Oryza sativa</i>	Rice
150	Poaceae	<i>Pennisetum purpureum</i>	Elephant grass
151	Poaceae	<i>Stenopaphrum secundatum</i>	Buffalo grass
152	Poaceae	<i>Zea mays</i>	Corn
153	Polygonaceae	<i>Persicaria hydropiperoides</i>	Small False water-pepper
154	Polygonaceae	<i>Polygonium</i> sp.	Polygonium
155	Polygonaceae	<i>Polygonium segetum</i>	Field Smartweed
156	Polygonaceae	<i>Rheum rhabarbarum</i>	Rhubarb
157	Polygonaceae	<i>Rumex</i> sp.	Rumex
158	Polygonaceae	<i>Rumex crispus</i>	Curly dock
159	Polygonaceae	<i>Rumex obtusifolius</i>	Broad Leaved Dock
160	Portulacaceae	<i>Portulaca oleracea</i>	Purslane
161	Portulacaceae	<i>Portulaca grandiflora</i>	Portulaca
162	Rosaceae	<i>Fragaria vesca</i>	Strawberry
163	Rosaceae	<i>Malus domestica</i>	Apple
164	Rosaceae	<i>Pyrus communis</i>	Common pear
165	Rosaceae	<i>Rosa</i> spp.	Rose
166	Rosaceae	<i>Rubus idaeus</i>	Raspberry
167	Rosaceae	<i>Rubus rosifolius</i>	Mauritius raspberry
168	Rubiaceae	<i>Coffea arabica</i>	Coffee
169	Rubiaceae	<i>Diodia ocimifolia</i>	Weed
170	Rubiaceae	<i>Gonzalagunia spictata</i>	
171	Rubiaceae	<i>Hamelia ptilens</i>	
172	Rubiaceae	<i>Pentas</i> sp.	Pentas
173	Rubiaceae	<i>Psycotria berteriana</i>	
174	Rubiaceae	<i>Spermacoce ocymifolia</i>	Slender Buttonweed
175	Rutaceae	<i>Citrus</i> sp.	Citrus trees
176	Rutaceae	<i>Citrus limon</i>	Lemon tree
177	Rutaceae	<i>Citrus grandis</i>	Grapefruit
178	Rutaceae	<i>Citrus sinensis</i>	Orange
179	Salicaceae	<i>Salix</i> sp.	Willow
180	Scrophulariaceae	<i>Bacopa stricta</i>	
181	Solanaceae	<i>Capsicum annuum</i>	Pepper
182	Solanaceae	<i>Cestrum macrophyllum</i>	Gala'n del monte
183	Solanaceae	<i>Lycopersicum esculentum</i>	Tomato
184	Solanaceae	<i>Nicotiana alata</i>	Jasmine tobacco
185	Solanaceae	<i>Nicotiana tabacum</i>	Tobacco
186	Solanaceae	<i>Solanum acerosum</i>	Arrebenta-cavalo
187	Solanaceae	<i>Solanum americanum</i>	American nightshade
188	Solanaceae	<i>Solanum andigenum</i>	Andigena
189	Solanaceae	<i>Solanum jamaicense</i>	Jamaica nightshade
190	Solanaceae	<i>Solanum melongena</i>	Eggplant
191	Solanaceae	<i>Solanum peruvianum</i>	Peruvian nightshade
192	Solanaceae	<i>Solanum rugosum</i>	Tabacon aspero
193	Solanaceae	<i>Solanum torvum</i>	Turkey Berry
194	Solanaceae	<i>Solanum tuberosum</i>	Potato
195	Teaceae	<i>Camelia japonica</i>	Camellia
196	Urticaceae	<i>Laportea aestuans</i>	West Indian woodnettle

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197	Urticaceae	<i>Urera bacifera</i>	Scratchbush
198	Verbenaceae	<i>Citharexylum fruticosum</i>	Fiddlewood
199	Violaceae	<i>Viola tricolor</i>	Pansy
200	Vitaceae	<i>Vitis labrusca</i>	Fox grape
201	Vitaceae	<i>Vitis vinifera</i>	Wine grape
202	Zingiberaceae	<i>Alpinia purpurata</i>	Red ginger