EFSA Journal 2015;13(1):3987

SCIENTIFIC OPINION

Scientific Opinion on the pest categorisation of *Spodoptera littoralis*[1]

EFSA Panel on Plant Health (PLH)[2, 3]

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ABSTRACT

The Panel on Plant Health undertook a pest categorisation of *Spodoptera littoralis* (Boisduval) for the territory of the European Union (EU). This insect is morphologically very similar to *S. litura* but the two species occupy very distinct geographical distributions, with only *S. littoralis* found in Europe and Africa. *S. littoralis* is established only in the southernmost parts of Europe where winters are not too cold. Long-distance northward migrations occur and the pest can also be transported throughout the EU with plants for planting. *S. littoralis* is highly polyphagous and it is an important pest of a very wide variety of outdoor vegetable, salad and ornamental crops in southern Europe. Field crops, such as lucerne, can also be affected, and even football pitches can be damaged. Population densities and damage vary considerably from year to year. Outbreaks also occur in protected crops, particularly ornamentals, throughout the EU. A very large number of insecticides are deployed to control this pest, which is resistant to many compounds. Resistance management and successful control of the pest can be obtained with mass trapping, mating disruption and attract-and-kill methods. *S. littoralis* is listed in Annex IAII and special requirements for *S. littoralis* are formulated in Annexes IVAI and IVAII of Council Directive 2000/29/EC to regulate the movement of plants for planting of three ornamental genera (*Dendranthema*, *Dianthus* and *Pelargonium*).

KEY WORDS

Egyptian cotton leaf worm, invasion biology, migrant, polyphagous, protected crops, quarantine pest, regulated non-quarantine pest

[1] On request from the European Commission, Question No EFSA-Q-2014-00275, adopted on 30 December 2014.

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Suggested citation: EFSA PLH Panel (EFSA Panel on Plant Health), 2015. Scientific Opinion on the pest categorisation of *Spodoptera littoralis*. EFSA Journal 2015;13(1):3987, 26 pp. doi:10.2903/j.efsa.2015.3987

Available online: www.efsa.europa.eu/efsajournal

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The current European Union plant health regime is established by Council Directive 2000/29/EC 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, 10.7.2000, p. 1).

The Directive lays down, amongst others, the technical phytosanitary provisions to be met by plants and plant products 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, the list of harmful organisms whose introduction into or spread within the Union is prohibited and the control measures to be carried out at the outer border of the Union on arrival of plants and plant products.

The Commission is currently carrying out a revision of the regulatory status of organisms listed in the Annexes of Directive 2000/29/EC. This revision targets mainly organisms which are already locally present in the EU territory and that in many cases are regulated in the EU since a long time. Therefore it is considered to be appropriate to evaluate whether these organisms still deserve to remain regulated under Council Directive 2000/29/EC, or whether, if appropriate, they should be regulated in the context of the marketing of plant propagation material, or be deregulated. The revision of the regulatory status of these organisms is also in line with the outcome of the recent evaluation of the EU Plant Health Regime, which called for a modernisation of the system through more focus on prevention and better risk targeting (prioritisation).

In order to carry out this evaluation, a recent pest risk analysis is needed which takes into account the latest scientific and technical knowledge on these organisms, including data on their agronomic and environmental impact, as well as their present distribution in the EU territory. In this context, EFSA has already been asked to prepare risk assessments for some organisms listed in Annex IIAII. The current request concerns 23 additional organisms listed in Annex II, Part A, Section II as well as five organisms listed in Annex I, Part A, Section I, one listed in Annex I, Part A, Section II and nine organisms listed in Annex II, Part A, Section I of Council Directive 2000/29/EC. The organisms in question are the following:

Organisms listed in Annex II, Part A, Section II:

- *Ditylenchus destructor* Thorne
- *Circulifer haematoceps*
- *Circulifer tenellus*
- *Helicoverpa armigera* (Hübner)
- *Radopholus similis* (Cobb) Thorne (could be addressed together with the IIAI organism *Radopholus citrophilus* Huettel Dickson and Kaplan)
- *Paysandisia archon* (Burmeister)
- *Clavibacter michiganensis* spp. *insidiosus* (McCulloch) Davis *et al*.
- *Erwinia amylovora* (Burr.) Winsl. et al. (also listed in Annex IIB)
- *Pseudomonas syringae* pv. *persicae* (Prunier *et al*.) Young *et al.*
- *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye
- *Xanthomonas campestris* pv. *pruni* (Smith) Dye
- *Xylophilus ampelinus* (Panagopoulos) Willems *et al.*
- *Ceratocystis fimbriata* f. sp. *platani* Walter (also listed in Annex IIB)
- *Cryphonectria parasitica* (Murrill) Barr (also listed in Annex IIB)
- *Phoma tracheiphila* (Petri) Kanchaveli and Gikashvili
- *Verticillium albo-atrum* Reinke and Berthold
- *Verticillium dahliae* Klebahn
- Beet leaf curl virus
- Citrus tristeza virus (European isolates) (also listed in Annex IIB)
- Grapevine flavescence dorée MLO (also listed in Annex IIB)

- Potato stolbur mycoplasma
- *Spiroplasma citri* Saglio et al.
- Tomato yellow leaf curl virus

Organisms listed in Annex I, Part A, Section I:

- *Rhagoletis cingulata* (Loew)
- *Rhagoletis ribicola* Doane
- Strawberry vein banding virus
- Strawberry latent C virus
- Elm phloem necrosis mycoplasm

Organisms listed in Annex I, Part A, Section II:

- *Spodoptera littoralis* (Boisd.)

Organisms listed in Annex II, Part A, Section I:

- *Aculops fuchsiae* Keifer
- *Aonidiella citrina* Coquillet
- Prunus necrotic ringspot virus
- Cherry leafroll virus
- *Radopholus citrophilus* Huettel Dickson and Kaplan (could be addressed together with IIAII organism *Radopholus similis* (Cobb) Thorne
- *Scirtothrips dorsalis* Hood
- *Atropellis* spp.
- *Eotetranychus lewisi* McGregor
- *Diaporthe vaccinii* Shear.

TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

EFSA is requested, pursuant to Article 29(1) and Article 22(5) of Regulation (EC) No 178/2002, to provide a pest risk assessment of *Ditylenchus destructor* Thorne, *Circulifer haematoceps*, *Circulifer tenellus*, *Helicoverpa armigera* (Hübner), *Radopholus similis* (Cobb) Thorne, *Paysandisia archon* (Burmeister), *Clavibacter michiganensis* spp. *insidiosus* (McCulloch) Davis et al., *Erwinia amylovora* (Burr.) Winsl. et al., *Pseudomonas syringae pv. persicae* (Prunier et al.*)* Young et al. *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye, *Xanthomonas campestris* pv. *pruni* (Smith) Dye, *Xyîophilus ampelinus* (Panagopoulos) Willems et al., *Ceratocystis fimbriata* f. sp. *platani* Walter, *Cryphonectria parasitica* (Murrill) Barr, *Phoma tracheiphila* (Petri) Kanchaveli and Gikashvili, *Verticillium alboatrum* Reinke and Berthold, *Verticillium dahliae* Klebahn, Beet leaf curl virus, Citrus tristeza virus (European isolates), Grapevine flavescence dorée MLO, Potato stolbur mycoplasma, *Spiroplasma citri* Saglio et al., Tomato yellow leaf curl virus, *Rhagoletis cingulata* (Loew), *Rhagoletis ribicola* Doane, Strawberry vein banding virus, Strawberry latent C virus, Elm phloem necrosis mycoplasma, *Spodoptera littoralis* (Boisd.), *Aculops fuchsiae* Keifer, *Aonidiella citrina* Coquillet, Prunus necrotic ringspot virus, Cherry leafroll virus, *Radopholus citrophilus* Huettel Dickson and Kaplan (to address with the IIAII *Radopholus similis* (Cobb) Thorne), *Scirtothrips dorsalis* Hendel, *Atropellis* spp., *Eotetranychus lewisi* McGregor and *Diaporthe vaccinii* Shear, for the EU territory.

In line with the experience gained with the previous two batches of pest risk assessments of organisms listed in Annex II, Part A, Section II, requested to EFSA, and in order to further streamline the preparation of risk assessments for regulated pests, the work should be split in two stages, each with a specific output. EFSA is requested to prepare and deliver first a pest categorisation for each of these 38 regulated pests (step 1). Upon receipt and analysis of this output, the Commission will inform EFSA for which organisms it is necessary to complete the pest risk assessment, to identify risk

reduction options and to provide an assessment of the effectiveness of current EU phytosanitary requirements (step 2). *Clavibacter michiganensis* spp. *michiganensis* (Smith) Davis et al. and *Xanthomonas campestris* pv. *vesicatoria* (Doidge) Dye, from the second batch of risk assessment requests for Annex IIAII organisms requested to EFSA (ARES(2012)880155), could be used as pilot cases for this approach, given that the working group for the preparation of their pest risk assessments has been constituted and it is currently dealing with the step 1 "pest categorisation". This proposed modification of previous request would allow a rapid delivery by EFSA by May 2014 of the first two outputs for step 1 "pest categorisation", that could be used as pilot case for this request and obtain a prompt feedback on its fitness for purpose from the risk manager's point of view.

As indicated in previous requests of risk assessments for regulated pests, in order to target its level of detail to the needs of the risk manager, and thereby to rationalise the resources used for their preparation and to speed up their delivery, for the preparation of the pest categorisations EFSA is requested, in order to define the potential for establishment, spread and impact in the risk assessment area, to concentrate in particular on the analysis of the present distribution of the organism in comparison with the distribution of the main hosts and on the analysis of the observed impacts of the organism in the risk assessment area.

ASSESSMENT

1. Introduction

1.1. Purpose

This document presents a pest categorisation prepared by the EFSA Scientific Panel on Plant Health (hereinafter referred to as the Panel) for the species *Spodoptera littoralis* (Boisduval) in response to a request from the European Commission.

1.2. Scope

This pest categorisation is for *S. littoralis*. The risk assessment area is the territory of the European Union (hereinafter referred to as the EU) with 28 Member States (hereinafter referred to as MS), restricted to the area of application of Council Directive 2000/29/EC.

2. Methodology and data

2.1. Methodology

The Panel performed the pest categorisation for *S. littoralis* following guiding principles and steps presented in the EFSA Guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010) and as defined in the International Standards for Phytosanitary Measures (ISPM) No 11 (FAO, 2013) and No 21 (FAO, 2004).

In accordance with the guidance on a harmonised framework for pest risk assessment in the EU (EFSA PLH Panel, 2010), this work is initiated as result of the review or revision of phytosanitary policies and priorities. As explained in the background of the European Commission request, the objective of this mandate is to provide updated scientific advice to European risk managers to take into consideration when evaluating whether those organisms listed in the annexes of Directive 2000/29/EC deserve to remain regulated under Council Directive 2000/29/EC, or whether they should be regulated in the context of the marketing of plant propagation material, or should be deregulated. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for quarantine pest according to ISPM 11 (FAO, 2013) but also for regulated non-quarantine pest according to ISPM 21 (FAO, 2004) and includes additional information required as per 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 ISPM 11 (FAO, 2013) and ISPM 21 (FAO, 2004) pest categorisation criteria on which the Panel bases its conclusions. It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regards to the principle of separation between risk assessment and risk management (EFSA founding regulation[4]); 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, in agreement with the Guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010).

[4] 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.

Table 1: International Standards for Phytosanitary Measures ISPM 11 (FAO, 2013) and ISPM 21 (FAO, 2004) pest categorisation criteria under evaluation.

Pest categorisation criteria	ISPM 11 for being a potential quarantine pest	ISPM 21 for being a potential regulated non-quarantine pest
Identity of the pest	The identity of the pest should be clearly defined to ensure that the assessment is being performed on a distinct organism, and that biological and other information used in the assessment is relevant to the organism in question. If this is not possible because the causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible	The identity of the pest is clearly defined
Presence (ISPM 11) or absence (ISPM 21) in the PRA area	The pest should be **absent from all or a defined part of the PRA area**	The pest is **present** in the PRA area
Regulatory status	If the pest is present but not widely distributed in the PRA area, it should be under official control or expected to be under official control in the near future	The pest is under official control (or being considered for official control) in the PRA area with respect to the specified plants for planting
Potential for establishment and spread in the PRA area	The PRA area should have ecological/climatic conditions including those in protected conditions suitable for the establishment and spread of the pest and, where relevant, host species (or near relatives), alternate hosts and vectors should be present in the PRA area	–
Association of the pest with the plants for planting and the effect on their intended use	–	Plants for planting are a pathway for introduction and spread of this pest
Potential for consequences (including environmental consequences) in the PRA area	There should be clear indications that the pest is likely to have an unacceptable economic impact (including environmental impact) in the PRA area	–
Indication of impact(s) of the pest on the intended use of the plants for planting	–	The pest may cause severe economic impact on the intended use of the plants for planting
Conclusion	If it has been determined that the pest has the potential to be a quarantine pest, the PRA process should continue. If a pest does not fulfil all of the criteria for a quarantine pest, the PRA process for that pest may stop. In the absence of sufficient information, the uncertainties should be identified and the PRA process should continue	If a pest does not fulfil all the criteria for a regulated non-quarantine pest, the PRA process may stop

In addition, in order to reply to the specific questions listed in the terms of reference, three issues are specifically discussed only for pests already present in the EU: the analysis of the present EU distribution of the organism in comparison with the EU distribution of the main hosts, the analysis of the observed impacts of the organism in the EU and the pest control and cultural measures currently implemented in the EU.

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process as it is clearly stated in the terms of reference that at the end of the pest categorisation the European Commission will indicate if further risk assessment work is required following its analysis of the Panel's scientific opinion.

2.2. Data

2.2.1. Literature search

A literature search on *S. littoralis* was undertaken at the beginning of the mandate. The search was conducted for the synonyms of the scientific name of the pest together with the most frequently used common names on the ISI Web of Knowledge database, CAB Abstracts and web-based search engines such as Google Scholar. Further references and information were obtained from experts, from citations within the references and from grey literature.

2.2.2. Data collection

To complement the information concerning the current situation of the pest provided by the literature and online databases on pest distribution, damage and management, the PLH Panel sent a short questionnaire on the current situation at country level, based on the information available in the European and Mediterranean Plant Protection Organization (EPPO) Plant Quarantine Retrieval (PQR) system, to the National Plant Protection Organisation (NPPO) contacts of the 28 EU Member States, and of Iceland and Norway. Iceland and Norway are part of the European Free Trade Association (EFTA) and contribute to EFSA data collection activities, as part of the agreements EFSA has with these two countries. A summary of the pest status based on EPPO PQR and NPPO replies is presented in Table 2.

Information on the distribution of the main host plants was obtained from the Eurostat database.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Taxonomy

The organism under assessment currently has the following valid scientific name:

Name: *Spodoptera littoralis* (Boisduval, 1833).

Prior to the review by Viette (1962), *S. littoralis* and *S. litura* were a single species under the scientific name of *Prodenia litura*.

Synonyms: Six synonyms are given by CABI (2014) and, of these, *Prodenia litura* Fabricius has been the most widely used.

Taxonomic position:

Domain: Eukaryota
Kingdom: Metazoa
Phylum: Arthropoda
Sub-phylum: Uniramia
Class: Insecta
Order: Lepidoptera
Family: Noctuidae
Genus: *Spodoptera*
Species: *Spodoptera littoralis*

Most applied common names: Egyptian cotton leafworm, Egyptian cotton worm, leafworm, Egyptian cotton, Mediterranean brocade moth, Mediterranean climbing cutworm, Mediterranean climbing cutworm, tobacco caterpillar, tomato caterpillar (English), gusano negro, rosquilla negra (Spanish), nottua del cotone (Italian), noctuelle méditerranéenne, ver du coton, la noctuelle africaine du coton (French), afrikansk bomuldsugle (Danish), Krysanteemiyökönnen (Finnish), Afrikanischer Baumwollwurm (German), afrikanskt bomullsfly (Swedish).

3.1.2. Pest biology

The literature on *S. littoralis* biology is extensive and, since detailed descriptions are available in EPPO (1997), Ellis (2004), CABI (2014) and Sullivan (2014), only those issues that relate to factors of particular relevance to the situation in the EU are summarised here.

Up to eight continuous generations can occur in hot countries, but at least two generations occur outdoors in southern Europe, with additional generations possible in protected cultivation (see section 3.4.3). The life cycle takes between 19 and 144 days depending on temperature (Ellis, 2004). No diapause has been reported. The thermal units required for the completion of generation is, on average, about 524 degree-days in the laboratory and about 545 in the field (calculated from air temperatures); with 9.9 °C considered to be the lower developmental threshold (Yones et al., 2012).

Preferring the underside of young leaves in the upper parts of the plants, females may lay over 3 000 eggs during their lifetime, in clusters of 20 to 500 covered in hair scales. There are six larval instars. Young larvae are gregarious and tend to stay on the plant during the day, but the last two instars, in particular, leave the plant by day and return to feed during the night. Pupae are formed within cocoons 3–5 cm deep in the soil. At 1 °C, the egg, larval and pupal stages take 9, 34 and 27 days, respectively, but at 36 °C only 2, 10 and 8 days, respectively (Ocete Rubio, 1984; quoted by CABI, 2014). The number of degree-days for each stage in the life cycle has been described by Yones et al. (2012). The phenological data have proved to be valuable when timing control measures.

Adults are nocturnal and the lifespan is reported as being between 5 and 10 days (Salama and Shoukry, 1972). Males are attracted to females by pheromones.

3.1.3. Intraspecific diversity

Section 3.1.1 summarises the taxonomy.

3.1.4. Detection and identification of the pest

The eggs are 0.6 mm in diameter and light green or creamy in colour until just before the larvae hatch, when they turn black. The larvae grow up to 45 mm in length. From the third instar, the larvae are hairless, varying in colour from greyish black, to dark green, reddish brown and whitish yellow. The sides have alternating dark and light bands. Photographs showing variations in the larvae, pupae and adults collected in Europe are provided on the Lepiforum website (Melzer, 2014).

S. littoralis is very closely related to *S. litura*. The adults of *S. littoralis* and *S. litura* cannot be distinguished by wing colour, but they can be separated by examining the genitalia (Brown and Dewhurst, 1975; Pogue, 2002). The larvae of the two species are also difficult to distinguish owing to variations in colour, but a bright yellow stripe on the dorsal surface is considered to be characteristic of *S. litura* (Brown and Dewhurst, 1975; Sullivan, 2014). Gilligan and Passoa (2014) provide a more detailed summary of the features that are helpful in larval identification. However, van de Vossenburg and van der Straten (2014) noted that these descriptions are valid only for late instars. Korycinska (2012) showed that *S. littoralis* and *S. litura* eggs could not be reliably separated with stereomicroscopy and scanning electron microscopy. Owing to the difficulties of identifying, in particular, eggs and young larvae (the stages that are most often intercepted), as well as pupae, van de Vossenburg and van der Straten (2014) developed rapid, reliable real-time polymerase chain reaction (PCR) tests for all stages of *S. littoralis*, *S. litura* and two other *Spodoptera* species. Nagoshi et al. (2011) showed that DNA barcodes can also be used to distinguish *S. littoralis* and *S. litura*. EPPO is preparing a diagnostic protocol for *Spodoptera* species.

The identification of *Spodoptera* interceptions is simplified because the two species have distinct geographical distributions (except that both species occur in south-west Asia). Based on EPPO PQR, *S. littoralis* is present in Africa, Europe and western Asia (easternmost country Iran) whereas the range of *S. litura* is in Australasia, southern and eastern Asia (westernmost country Iraq). However, according to Pogue (2002), *S. littoralis* has been found as far east as Pakistan. Care must be taken in Europe because outbreaks of *S. litura* have also occurred in the EU (Aitkenhead et al., 1974).

Pheromone and light traps that attract males have been used to monitor, control and assist with the timing of control measures. Ellis (2004) provides guidance both for the visual inspection of plants for eggs, larvae, pupae and adults and for surveys.

Young larvae prefer young tender leaves that may be skeletonised by their feeding activity. Older larvae can strip the plants by consuming whole leaves. They also feed on young shoots, stalks, bolls, buds and fruit, causing feeding scars. Large holes can be created by chewing, and they may also mine shoots and stalks (Sullivan, 2014).

3.2. Current distribution of the pest

3.2.1. Global distribution of the pest

As shown in Figure 1, the pest is present and widespread in southern Europe, Africa and the Near East, as far east as Iran (although Pogue (2002) recorded this pest from Pakistan). However, it is important to note that (i) as summarised in section 3.1.4, populations of *S. littoralis* may be confused with *S. litura* in Iraq, Iran and Pakistan, where both species are present, and (ii) this map does not include countries in northern Europe where transient populations of *S. littoralis* may sometimes occur.

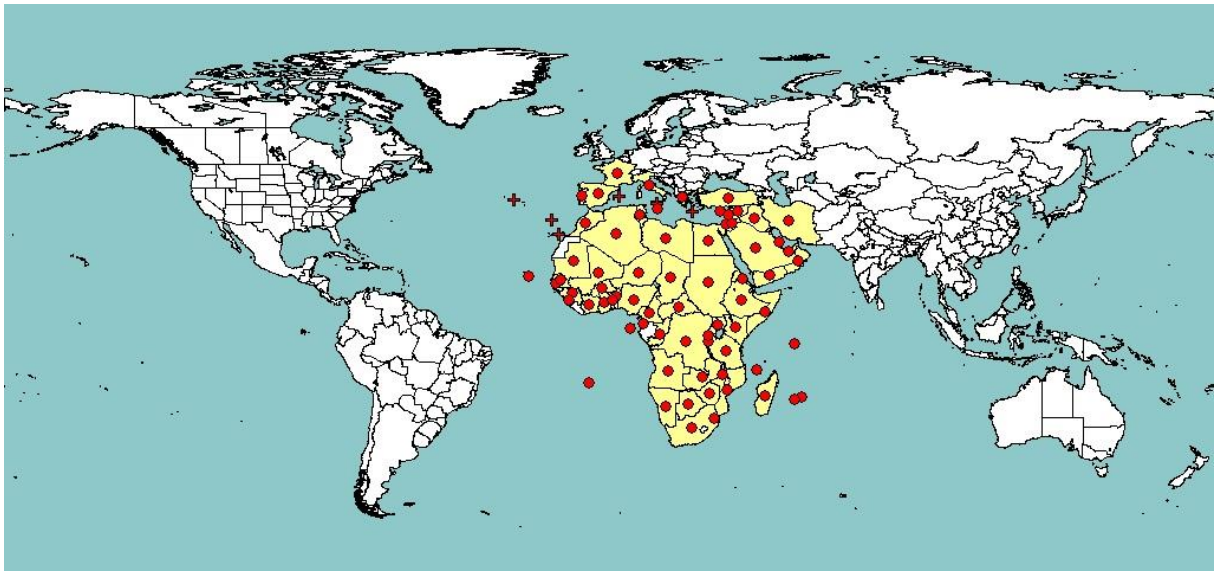

Figure 1: Global distribution of *Spodoptera littoralis* (extracted from EPPO PQR, 2014). Red circles represent pest presence as national records and red crosses show pest presence as sub-national records

3.2.2. Pest distribution in the EU

Table 2: Current distribution of *Spodoptera littoralis* in the 28 EU MS, Iceland and Norway, based on the answers received via email from the NPPOs or, in the absence of a reply, on information from EPPO PQR (2014, and other sources if relevant)

Country	NPPO answer	NPPO comments
Austria	Absent, no pest records	
Belgium	Absent, no pest records	See status NPPO 2007 in PQR5. No records since 2007. Survey ongoing in a research project in 2014–15
Bulgaria	Absent, confirmed by survey	
Croatia	Absent, no pest records	
Cyprus	Present, widespread (EPPO PQR)	
Czech Republic	Absent, no pest records	
Denmark	Absent, intercepted only	
Estonia	Absent, no pest records	
Finland	Absent, pest eradicated	
France	Present, few occurrences	
Germany	Present, only in some areas	
Greece[(a)]	Present: restricted distribution	
Hungary	Absent, no pest records	
Ireland	Absent, no pest records	
Italy	Present, restricted distribution Sicily no details	Present, widespread in some years, above all in south Italy, including Sicily. Depending on the climatic conditions, damage also occurs in northern Italy, both outdoors and indoors
Latvia [(a)]		
Lithuania [(a)]		

Country	NPPO answer	NPPO comments
Luxembourg [(a)]		
Malta	Present: restricted distribution	
Netherlands	Absent, pest eradicated, confirmed by survey	
Poland	Present: few occurrences (in glasshouses only)	In the years 2009–2013 a total of 10 796 visual inspections were carried out by the State Plant Health and Seed Inspection Service (SPHSIS) on host plants. In addition, 205 samples were lab tested. All samples tested negative. In accordance with the results of scientific studies, the pest has been introduced a few times to glasshouses on plant material coming from third states (not direct export but movement from other MS) and other EU MS. Detections of this organism have not been confirmed by SPHSIS
Portugal	Present	
Romania[(a)]		
Slovak Republic	Absent, no pest record	
Slovenia	Absent, no pest records	
Spain	Present south Spain	
Sweden	Absent, pest no longer present	Migrating species that has been observed once on the island of Öland in 2003
United Kingdom	Absent	Pest eradicated in England—no longer present
Iceland [(a)]		
Norway [(a)]		

(a): When no information was made available to EFSA, the pest status in the EPPO PQR (2012) was used.
–, No information available; EPPO PQR, European and Mediterranean Plant Protection Organization Plant Quarantine Data Retrieval System; NPPO, National Plant Protection Organisation.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

Regulated hosts for *S. littoralis*

This species is a regulated harmful organism in the EU and listed in Council Directive 2000/29/EC in Annex I as shown in Table 3.

Table 3: *S. littoralis* in Annex IAII of Council Directive 2000/29/EC

Annex I, Part A—Harmful organisms whose introduction into, and spread within, all Member States shall be banned
Section II—Harmful organisms known to occur in the Community and relevant for the entire Community
(a) Insects, mites and nematodes, at all stages of their development
9. *Spodoptera littoralis* (Boisduval)

Regulated hosts for *S. littoralis*

Because of its listing in Annex I, Part A, Section II, the introduction and spread of *S. littoralis*, whether or not in association with any host commodity entering into or moving within the EU, is prohibited since no specific host plants are mentioned. *S. littoralis* is a polyphagous pest (see section 3.4.1, Host range) and may be present on many plants and plant parts. However, special requirements for the introduction into and movement within the EU with respect to *S. littoralis* have been formulated only for plants for planting of *Dendranthema*, *Dianthus* and *Pelargonium* (Table 4). It is important to mention that other specific commodities could also be a pathway of introduction of the pest in the risk assessment area.

Specific requirements of Annex IV and Annex V of Council Directive 2000/29/EC with respect to *S. littoralis* are presented in Table 4.

Table 4: *S. littoralis* host plants in Annexes IV and V of Council Directive 2000/29/EC

Annex IV, Part A—Special requirements which must be laid down by all Member States for the introduction and movement of plants, plant products and other objects into and within all Member States	
Section I—Plants, plant products and other objects originating outside the Community	
Plants, plant products and other objects	**Special requirements**
27.1. Plants of *Dendranthema* (DC.) Des Moul., *Dianthus* L. and *Pelargonium* l'Hérit. ex Ait., intended for planting, other than seeds	Official statement that: (aa) the plants originate in an area free from *Helicoverpa armigera* (Hübner) and *Spodoptera littoralis* (Boisd.), established by the National Plant Protection Organisation in accordance with relevant International Standards for Phytosanitary Measures, or (a) no signs of *Helicoverpa armigera* (Hübner) or *Spodoptera littoralis* (Boisd.) have been observed at the place of production since the beginning of the last complete cycle of vegetation or (b) the plants have undergone appropriate treatment to protect them from the said organisms.
Section II—Plants, plant products and other objects originating in the Community	
Plants, plant products and other objects	**Special requirements**
20. Plants of *Dendranthema* (DC.) Des Moul., *Dianthus* L. and *Pelargonium* l'Hérit. ex Ait., intended for planting, other than seeds	Official statement that: (aa) the plants originate in an area free from *Helicoverpa armigera* (Hübner) and *Spodoptera littoralis* (Boisd.), established by the National Plant Protection Organisation in accordance with relevant International Standards for Phytosanitary Measures, or (a) no signs of *Helicoverpa armigera* (Hübner) or *Spodoptera littoralis* (Boisd.) have been observed at the place of production since the beginning of the last complete cycle of vegetation or (b) the plants have undergone appropriate treatment to protect them from the said organisms.

Annex V—Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the Community, before being moved within the Community—in the country of origin or the consignor country, if originating outside the Community) before being permitted to enter the Community
Part A—Plants, plant products and other objects originating in the Community
Section I—Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community and which must be accompanied by a plant passport
1. Plants and plant products
1.1–1.6: because *S. littoralis* is extremely polyphagous, these commodities are all relevant
2. Plants, plant products and other objects produced by producers whose production and sale is authorised to persons professionally engaged in plant production, other than those plants, plant products and other objects which are prepared and ready for sale to the final consumer, and for which it is ensured by the responsible official bodies of the Member States, that the production thereof is clearly separate from that of other products.
2.1–2.3.1: because *S. littoralis* is extremely polyphagous, these commodities are all relevant.
Part B—Plants, plant products and other objects originating in territories, other than those territories referred to in part A
Section I—Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community
1–3: because *S. littoralis* is extremely polyphagous, these commodities are all relevant.

3.3.2. Marketing directives

Because *S. littoralis* is extremely polyphagous, all marketing directives are relevant. Host plants of *S. littoralis* are explicitly mentioned in the following marketing directives:

Council Directive 98/56/EC[5]: *Dendranthema, Dianthus, Pelargonium*.

3.4. Elements to assess the potential for establishment and spread in the EU

3.4.1. Host range

S. littoralis is extremely polyphagous. Salama et al. (1970) identified hosts from 40 families, including 87 hosts of economic importance. CABI (2014) lists 63 main, 50 other and 12 wild hosts, where main hosts are those on which economic damage occurs and other hosts are "other crops attacked by the pest, but not as often or not as severely" (Lesley McGillivray, CABI, personal communication, 2014).

Many of the main hosts listed in CABI (2014) are important crops in Europe, e.g. *Allium* spp. (onion), *Beta vulgaris* (beet), *Brassica oleracea* (cabbage, broccoli), *Brassica rapa* (turnip), *Brassica* spp. (mustards), *Capsicum annuum* (pepper), *Chrysanthemum* spp., *Citrullus lanatus* (watermelon), *Citrus* spp., *Cucumis* spp. (squash, pumpkin), *Cynara cardunculus* (artichoke), *Daucus carota* (carrot), *Dianthus caryophyllus* (carnation), *Ficus* spp. (fig), *Glycine max* (soybean), *Gossypium* spp. (cotton), *Helianthus annuus* (sunflower), *Lactuca sativa* (lettuce), *Linum* spp. (flax), *Medicago sativa* (alfalfa), *Morus* spp. (mulberry), *Nicotiana tabacum* (tobacco), *Oryza sativa* (rice), *Phaseolus* spp. (bean), *Pisum sativum* (pea), *Prunus domestica* (plum), *Punica granatum* (pomegranate), *Raphanus sativus* (radish), *Rosa* spp. (rose), *Saccharum officinarum* (sugarcane), *Solanum lycopersicum* (tomato), *Solanum melongena* (eggplant), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Spinacia* spp. (spinach), *Trifolium* spp. (clover), *Triticum aestivum* (wheat), *Vicia faba* (broad bean), *Vitis vinifera* (grape) and *Zea mays* (corn).

3.4.2. EU distribution of main host plants

Hosts are ubiquitous both outdoors and in protected cultivation (see section 3.4.1).

[5] Council Directive 98/56/EC of 20 July 1998 on the marketing of propagating material of ornamental plants. OJ L 226/16, 13.8.98, p. 16–23.

3.4.3. Analysis of the potential pest distribution in the EU

Hosts are available throughout the EU in the field, in protected cultivation and as wild species.

Up to eight continuous generations of *S. littoralis* have been observed in tropical areas. In Egypt, seven generations have been reported (Egyptian research referred to by CABI, 2014) and on the coastal plain of Israel seven or eight generations have been reported (Avidov and Harpaz, 1969). Outdoors, at least two generations (Sarto i Monteys, 1984) per year have been observed in southern Spain and three near the coast of southern France, with an additional one or two generations possible in protected cultivation (Coquempot and Ramel, 2008). In southern Italy, at least two generations occur outdoors, and up to seven in protected cultivation (Sannino, 2003).

Because the pest does not diapause, it can successfully overwinter outdoors only in the southernmost parts of the EU, where the winters are relatively warm. Even in Israel, nearly 100 % mortality can occur over winter (Avidov and Harpaz, 1969). Although it is not as strong a migrant as some Lepidoptera, e.g. *Helicoverpa armigera*, small populations that may overwinter in north-east Spain and southern France in mild winters (Coquempot and Ramel, 2008) are supplemented by immigration from southern Spain (Sarto i Monteys, 1984).

Miller (1977) found that all stages were vulnerable to prolonged temperatures below the minimum threshold of development (13 °C). To exploit the vulnerability to cool temperatures, cold storage has been deployed as a quarantine treatment (Miller, 1976). Pupae were found to be the most resistant to cold conditions but, following exposure for 70 days at this temperature, only a few deformed adults emerged. Since such conditions occur in northern coastal areas of the Mediterranean, Miller (1977) concluded that the successful outdoor overwintering of pupae would be confined to southern coastal areas of Europe, such as Malta. Overwintering populations, mainly pupae, have been observed in Cyprus and southern areas of Spain, Italy, Greece and France (Miller, 1977; Sarto i Monteys, 1984; Cocquempot and Ramel, 2008; CABI, 2014; Luigi Sannino, Unità di Ricerca per le Colture Alternative al Tabacco (CRA-CAT), Italy, personal communication, 2014). Successful overwintering survival in France is considered to be unusual but may well occur in mild winters, such as in 2006–2007 (Cocquempot and Ramel, 2008) and 2013–2014 (Jean-Marie Ramel, INRA, France, personal communication, 12 November 2014). Overwintering of larvae is also possible in glasshouses in coastal areas of southern Europe (Sannino, 2003). Glasshouses also allow pupae to overwinter far from the Mediterranean coast (e.g. in Northern Italy) (Sannino, personal communication). Outbreaks have occasionally occurred in northern European glasshouses (EPPO, 1997) and have been subject to successful eradication (Bartlett and Macdonald, 1993).

In conclusion, continuous breeding occurs in the EU only in southernmost areas with relatively mild winters where the pest can overwinter.

3.4.4. Spread capacity

Although the observation by Salama and Shoukry (1972) that adults can fly up to 1.5 km during a four-hour period suggests that extensive spread is possible, the same authors also report that the adult lifespan is relatively short, at 5 to 10 days. In Israel, longevity varied between the sexes and according to season, being 2–7 days in summer, 3–11 days in autumn and up to 10–22 days in winter (Avidov and Harpaz, 1969). If representative of the populations dispersing in the EU, this is likely to limit the species' migratory activity. Campion et al. (1977) found no evidence of immigration to Cyprus during a seven-month pheromone trapping campaign. However, Sarto i Monteys (1984) concluded that adults found in September–November 1983 in Catalonia and south-east France were the offspring of a migratory front that left southern Spain at the end of August. In addition, Cocquempot and Ramel (2008) considered that the moths found in northern France in 2006 and 2007 could have come only from immigration. In the UK, adults have been found on six occasions during periods of high migrant moth activity (Waring and Townsend, 2009).

An alternative explanation is that findings outside areas where overwintering is possible in southern Europe are due to movement in trade. It is certainly the case that the species is very commonly intercepted in the USA (Sullivan, 2014) and the EU. On 21 November 2014, the Europhyt database held 649 interceptions of *S. littoralis*, with about 85 % of the interceptions occurring since 2007. The vast majority of interceptions were reported by the Netherlands (ca. 93 %), with a further 5 % by the UK. Most of the interceptions originated from Eastern Africa (ca. 85 %), with a further 10 % from the Middle East. Nearly 80 % of the interceptions took place on shipments of *Rosa* spp., with some interceptions on *Aster*, *Begonia*, *Chrysanthemum*, *Dianthus*, *Eryngium*, *Eustoma*, *Lisianthus*, *Mentha*, *Ocimum*, *Pelargonium*, *Petunia*, *Ranunculus*, *Solanum melongena* and *Solidago* spp. Although movement with trade has been implicated in causing outbreaks in protected cultivation (Bartlett and Macdonald, 1993) in the UK, no wild records could be traced to imports or glasshouse infestations (Heath and Emmet, 1983).

In Israel, "wandering regiments of larvae from a recently cut fodder crop may attempt to reach adjacent fodder plots, vegetable fields or other farm crops" (Avidov and Harpaz, 1969).

3.5. Elements to assess the potential for consequences in the EU

3.5.1. Potential pest effects

S. littoralis is one of the most destructive agricultural lepidopterous pests within its subtropical and tropical range. It can attack numerous economically important crops all the year round" (EPPO, 1997), primarily by feeding on the leaves and consuming all but the larger veins. In tomatoes, larvae can bore into the fruit, making them unsuitable for consumption. On cotton, the pest also attacks fruiting points, flower buds and occasionally the bolls (EPPO, 1997). In *Chrysanthemum*, buds and flowers have been seriously damaged in UK glasshouses (Carter, 1984). In Israel, in addition to the damage to the leaves of many crops, tomato and pepper fruit can be destroyed and apples and grape fruit (and grape stalks) can be attacked. Reported resistance to insecticides (e.g. Horowitz et al., 1998) increases the potential for damage.

Intense exposure to the sun following serious leaf loss can affect grape vine development in the following year. Clover fields can be devastated a few days after germination and damage to a second sowing can also be very heavy (Avidov and Harpaz, 1969).

S. littoralis was reported to have potential impacts not only on ecosystems and agricultural production, but also on human infrastructure and administration, in a comparative assessment of the impacts of 77 terrestrial arthropod species alien to Europe and invasive in many countries (Vaes-Petignat and Nentwig, 2014). With regard to environmental consequences, it was shown that *S. littoralis* has a potential disruptive impact on native tri-trophic interactions involving *Brassica rapa* (Chabaane et al. 2015).

3.5.2. Observed pest impact in the EU

In Europe, the impacts caused by *S. littoralis* were minimal until about 1937 (EPPO, 1997) and damage has occurred sporadically (but sometimes significantly) ever since.

In Spain, *S. littoralis* was a particularly important pest in 1949, when lucerne, potatoes and other vegetable crops were attacked in southern Spain (EPPO, 1997), and then again in the 1990s. Owing to the control methods (see section 3.5.3) used against other pests of cotton, rice, protected vegetables (tomato, pepper, aubergine, bean, courgette, cucumber, melon and watermelon), alfalfa, carnation and mini carnation under cover, strawberry, beet, carrot and parsnip, as well as industrial tomatoes, it is now considered to be of secondary importance in Andalusia. However, damage has also been observed to crops of artichoke, celery, watercress, canary banana and ornamentals, such as lawn grass. The Real Betis football pitch in Seville had to be re-sown in the first week of September 2013 as a result of an attack of the pest in mid-August (Jose-Maria Guitian Castrillon, TRAGSATEC, Spain, personal communication, 3 November 2014).

In France, the first outdoor damage was recorded only in 2007, in a mint crop on the Côte d'Azur; subsequently, in 2008, it was recorded in a protected *Begonia* crop in Poitou-Charentes, central France (Cocquempot and Ramel, 2008). In 2009, crops of chard, lettuce, arum and anemone were seriously damaged in Corsica (Fredon Corse, 2014). Pheromone traps were deployed in 2013 and 2014 because of serious damage to lettuce and chard (Jean-Marie Ramel, personal communication 12 November 2014).

In Italy, *S. littoralis* is considered to be an important pest infesting horticultural crops (and floriculture) in southern Italy and in Liguria. Since the 1980s it has gradually spread, finding suitable conditions in coastal areas characterised by intensive agriculture with the presence of protected crops (Sannino, 2003). Populations can reach high densities between spring and autumn thanks to very favourable environmental conditions (lack of natural enemies, the presence of greenhouses, mild winters and availability of food plants) and individual characteristics of the species (high fertility, marked polyphagy, lack of diapause and resistance to common insecticides). Epidemics of nuclear polyhedrosis virus in the autumn are an important mortality factor limiting the extent of any outbreaks (Sannino, personal communication).

In the Peloponnese area of Greece there have been outbreaks on lucerne, cabbages and pepper in some years, but it is not very common on tomato (Dionyssios Perdikis, Agricultural University of Athens, Greece, personal communication, 27 October 2014).

In the UK in 1963–4, linked to the beginning of the trade in importing *Dendranthema* (chrysanthemum) cuttings for year-round cut flower production, large numbers of outbreaks occurred in glasshouses. Further outbreaks occurred in the 1970s. In the 1980s and 1990s outbreaks occurred in relation to the imports of a wide range of pot plants. Bartlett and Macdonald (1993) summarised the extensive damage caused until measures for control and eradication were devised. Occasional findings of *S. littoralis* associated with imported cuttings of *Dendranthema* and *Begonia* have been made in the 2000s (UK unpublished data).

3.6. Currently applied control methods in the EU

Since it is not possible to eradicate *S. littoralis* from areas where it is established (Sannino, 2003), appropriate control strategies are required to limit the damage. This is typically at a maximum in September and October, coinciding with the peak adult flight period. *S. littoralis* is generally difficult to control. Owing to its extreme polyphagy (see section 3.4.1), specific control protocols may be required for the different crops attacked throughout the year. In addition, one of the main problems related to the control of *S. littoralis* is its capacity to develop resistance.

In areas where the insect is established, it is necessary to monitor the crop constantly to detect the first outbreaks. The use of pheromone traps for monitoring flight is crucial for the implementation of integrated pest management (IPM) protocols and to ensure that control measures are as precise and efficient as possible (Sannino, personal communication). In recent years, most products that are authorised for use against lepidopteran pests have reduced toxicity and short harvest intervals, making it possible to set up appropriate IPM programmes and to adopt rotation strategies to prevent the development of resistance (Luigi Sannino, personal communication).

Many ingredients that are active against *S. littoralis* are used in the EU, as listed in national and regional protocols (e.g. Registro de Productos Fitosanitarios, Ministerio de Agricultura, Alimentación y Medio Ambiente, España; MAGRAMA, 2014); Regional Agriculture Departments for Italy and Ministry of Rural Development and Food of Hellenic Republic for Greece). These include benzoylureas (e.g. diflubenzuron, lufenuron), oxadiazines (e.g. indoxacarb), pyrethroids (e.g. bifenthrin, cypermethrin, deltamethrin, etofenprox, lambda-cyhalothrin), pyrazoles, spinosyns (e.g. spinosad), carbamates (e.g. carbaryl), organophosphates (e.g. chlorpyrifos), moulting hormone agonists (e.g. methoxyfenozide) and other compounds derived from, for example, fungi (e.g. emamectin) and plants (e.g. azadirachtin). In France, it was found that Karate K (lambda cyhalothrin),

D6 and Altacor were inefficient. *Bacillus thuringiensis* is used against the first larval stages (Jean-Marie Ramel, personal communication).

At the onset of the infestation or near harvest time, microbiological formulations based on *B. thuringiensis* (subsp. *aizawai* and *kurstaki*) or nuclear polyhedrosis virus are preferable. These control options limit the levels of residue in the harvested crops and are an effective anti-resistance measure. However, only some strains *B. thuringiensis* are fully effective, since the pest is resistant to many strains of *B. thuringiensis* (Salama et al. 1989, cited in CABI, 2014).

Several biological control agents have been tested, and both parasitoids and predators have been documented (CABI, 2014), including fungi, microsporidia and parasitic nematodes, e.g. *Neoaplectana carpocapsae*, but none of them has been commercialised. In Spain, *S. littoralis* is controlled effectively using entomopathogenic nematodes in IPM systems (Galeano et al., 2009), e.g. the two nematodes *Steinernema feltiae* and *Heterorhabditis bacteriophora* are used. Furthermore, *Macrolophus caliginosus* is used in France (www.fredon-corse.com/ravageurs/ Noctuelle_mediterraneenne.htm). *S. littoralis* is also mentioned in the context of biological control for greenhouses in northern Europe by Van Lenteren (2000, 2007).

Pheromone traps baited with (9Z,11Z)-(9,11)-tetradecadienyl acetate and (9Z,12Z)-(9,12)-tetradecadienyl acetate are highly effective in trapping males (Kehat and Dunkelblum, 1993). The males are also attracted to light, and light traps have been used to monitor and help control outbreaks in protected cultivation (Bartlett and Macdonald, 1993). Ellis (2004) provides guidance both for the visual inspection of plants for eggs, larvae, pupae and adults and for surveys.

Cultural methods are also being considered in France, including the use of fields with hedges that host natural enemies, crop rotation, and other factors, such as planting later in the year (Jean-Marie Ramel, personal communication).

Successful methods to control *S. littoralis* and manage resistance rely on mass trapping, mating disruption and "attract-and kill" methods to significantly reduce mating and crop damage. The only constraint to these methods is their high cost (Guerrero et al., 2014). Guerrero et al. (2014) also provide an overview of semiochemical and natural product-based approaches to control *Spodoptera* spp.

3.7. Uncertainty

Uncertainty is mainly related to the lack of information from some MS concerning the current situation with respect to establishment, impact, control and resistance.

CONCLUSIONS

The Panel summarises in Table 5 its conclusions on the key elements addressed in this scientific opinion in consideration of the pest categorisation criteria defined in ISPM 11 and ISPM 21 and of the additional questions formulated in the terms of reference.

Table 5: The Panel's conclusions on the pest categorisation criteria defined in the International Standards for Phytosanitary Measures No 11 and No 21 and on the additional questions formulated in the terms of reference

Criterion of pest categorisation	Panel's conclusions on ISPM 11 criterion	Panel's conclusions on ISPM 21 criterion	Uncertainties
Identity of the pest	*Is the identity of the pest clearly defined? Do clearly discriminative detection methods exist for the pest?* *S. littoralis* is a distinct taxon but it is so morphologically similar to *S. litura* that, apart from the adult genitalia, only PCR methods provide a reliable means of separating the two species. However, except in Iraq, Iran and Pakistan, the two species occupy distinct geographical distributions, with *S. littoralis* occurring in Europe, Africa and the Near East while *S. litura* is found in Australasia and more eastern central and southern areas of Asia		Care must be taken in interpreting the literature and interception data from some areas, as misidentification can occur
Absence/presence of the pest in the risk assessment area	*Is the pest absent from all or a defined part of the risk assessment area?* It is established outdoors only in the southernmost areas of the EU. Elsewhere, it is transient, with individuals arriving by immigration and with trade	*Is the pest present in the risk assessment area?* It is established outdoors in the southernmost areas of the EU	Information is missing or not up to date from some MS
Regulatory status	*Mention in which annexes of Council Directive 2000/29/EC and the marketing directives the pest and associated hosts are listed without further analysis. Indicate also whether the hosts and/or commodities for which the pest is regulated in AIIAI or II are comprehensive of the host range* *S. littoralis* is listed in Annex IAII of Council Directive 2000/29/EC. Special requirements to regulate the movement of plants for planting excluding seeds in three ornamental genera (*Dendranthema*, *Dianthus* and *Pelargonium*) with respect to *S. littoralis* are formulated in Annexes IVAI and IVAII. Host plants intended for planting must be subject to a plant health inspection before entry into or before movement within the EU, according to Annexes VAI and VBI. Hosts of *S. littoralis* are included in a large number of measures in both the EU Plant Health and the Marketing Directives. However, *S. littoralis* has many more potential host plants than the three genera for which it is regulated in Annex IV		
Potential establishment and spread	*Does the risk assessment area have ecological conditions (including climate and those in protected conditions) suitable for the establishment and spread of the pest? Indicate whether the host plants are also grown in areas of the EU where the pest is absent. And, where relevant, are host species (or near relatives), alternative hosts and vectors present in the risk assessment area?* Ecological conditions are suitable for establishment outdoors only in the southernmost areas of the EU, although hosts are available throughout the EU	*Are plants for planting a pathway for introduction and spread of the pest?* Plants for planting are the most important pathway for the spread of *S. littoralis* to protected cultivation. Outdoors, the migration of adult moths is the most important pathway in southern Europe	Uncertainty exists about where *S. littoralis* can establish throughout the year

Criterion of pest categorisation	Panel's conclusions on ISPM 11 criterion	Panel's conclusions on ISPM 21 criterion	Uncertainties
Potential for consequences in the risk assessment area	*What are the potential consequences in the risk assessment area?* *Provide a summary of impact in terms of yield and quality losses and environmental consequences* In southern parts of Europe, the pest can be sporadically damaging to a very wide variety of outdoor vegetable, salad and ornamental crops. Field crops, such as lucerne, can be affected and even football pitches can be damaged. The severity and the extent of the damage vary considerably from year to year. Transient outbreaks occur from time to time in protected crops throughout the EU, notably to ornamental crops such as chrysanthemum. The movement of *S. littoralis* with plants for planting is of particular concern to protected cultivation because adults following the other main pathway, migration, are only likely to cause outbreaks in outdoor crops. Insecticide resistance is widespread and a large number of compounds may be used for control.	*If applicable is there indication of impact(s) of the pest as a result of the intended use of the plants for planting?* The movement of *S. littoralis* with plants for planting is of particular concern to protected cultivation because adults following the other main pathway, migration, are only likely to cause outbreaks in outdoor crops.	Information is missing or not up to date from some MS. The factors responsible for the sporadic outputs in southern Europe are not clearly understood.
Conclusion on the pest categorisation	Under protected cultivation (i.e. greenhouses and crops grown under cover) in northern areas of the EU, this pest is not widely distributed, causes significant damage and is under official control. It is established outdoors in southernmost areas of the EU and transient populations may develop from migrating adults further north. It is under official control only for plants for planting of a few of its potential hosts	For protected cultivation, plants for planting are the main source of infestation that results in significant impact. Outdoors, the principal pathway is the movement of migrating adults	

Criterion of pest categorisation	Panel's conclusions on ISPM 11 criterion	Panel's conclusions on ISPM 21 criterion	Uncertainties
Conclusion on the specific ToR questions	*If the pest is already present in the EU, provide a brief summary of* *- the analysis of the present distribution of the organism in comparison with the distribution of the main hosts, and the distribution of hardiness/climate zones, indicating in particular if in the risk assessment area, the pest is absent from areas where host plants are present and where the ecological conditions (including climate and those in protected conditions) are suitable for its establishment, and* *- the analysis of the observed impacts of the organism in the risk assessment area* *S. littoralis* is highly polyphagous and its hosts are found outdoors and indoors throughout the EU. However, because it has only a limited capacity to survive cold weather, it is established only in the southernmost parts of the EU. Adults from these areas can fly northwards, occasionally reaching northern EU MS. Although damaging pest populations can be found in protected cultivation in most MS, there are no records of establishment. *S. littoralis* is an important pest of a very wide variety of outdoor vegetable, salad and ornamental crops in southern Europe. Field crops, such as lucerne, can also be affected and even football pitches can be damaged. Population densities and damage vary considerably from year to year. Outbreaks can also occur in crops under protected conditions throughout the EU. A very large number of insecticides are deployed to control this pest and it is resistant to many compounds.		

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ABBREVIATIONS

EFSA	European Food Safety Authority
EPPO	European and Mediterranean Plant Protection Organization
EPPO-PQR	European and Mediterranean Plant Protection Organization Plant Quarantine Retrieval System
EU	European Union
IPM	Integrated Pest Management
ISPM	International Standards for Phytosanitary Measures
MS	Member State(s)
NPPO	National Plant Protection Organisation
PCR	Polymerase Chain Reaction
PLH Panel	Plant Health Panel
PRA	pest risk analysis