A review of the regulatory status of *Helicoverpa armigera* in Great Britain

June 2025

Introduction

Helicoverpa armigera (Lepidoptera: Noctuidae), commonly referred to as the cotton bollworm, is a pest of many important crops worldwide. This species is characterised by its global distribution, a wide host range and the exceptional dispersal abilities of adult moths. Globally the most important crops impacted by *H. armigera* are tomato, cotton, pigeon pea, chickpea, sorghum and cowpea (Lammers & MacLeod 2007). Other crops of particular importance to GB are maize, potatoes, chrysanthemums and pelargoniums. A review of the regulatory status of *H. armigera*, which is currently a quarantine pest in GB, has been conducted.

This review has been prompted by regular interceptions of *H. armigera* on imported plant products. The phytosanitary risk to GB from plant products infested with *H. armigera* is considered to be low as *H. armigera* is predicted to be unable to establish outdoors in GB and there is a lack of a pathway from plant products for consumption into protected ornamental plant production sites where *H. armigera* could persist. The current regulatory status of *H. armigera* requires action to be taken on findings of *H. armigera* in all situations including those on plant products. Currently plant products infested with *H. armigera* are permitted to move directly to GB retail, wholesale or for food processing under a conditional release notice. This is unlike the majority of other quarantine pests whereby destruction of the consignment would be required.

In addition to these regular interceptions of *H. armigera* on imported plant products, two transient populations of *H. armigera* in crops of *Zea mays* (maize) were detected in southern England in the 2024 growing season. These transient populations were judged to have been initiated by the natural dispersal of this species from continental Europe rather than via movement in trade. The migration of this pest into the UK has been occurring for decades and is predicted to continue. There is, therefore, a lack of measures which can be taken to prevent natural dispersal and the predicted arrival of *H. armigera* adults in summer conditions.

The phytosanitary import regime in Great Britain is not static and is kept under continuous review to ensure it continues to address any biosecurity risk posed to the UK, and that it meets our World Trade Organisation obligations by being risk-based. Therefore, following the findings in the summer of 2024 and continued interceptions in low-risk pathways, the benefits of continuing to regulate *H. armigera* are considered in this review. Stakeholders are asked for their views on the following review and the proposal to deregulate *H. armigera*.

Biology of *H. armigera*

Distribution

Helicoverpa armigera is a Lepidopteran pest with a global distribution, the notable region where *H. armigera* is absent is North America (Figure 1). It has yet to become established in North America, however following introductions into South America in the 2010s and subsequent rapid expansion this is thought to be inevitable with time (Kriticos *et al.,* 2015). The discovery and presence of *H. armigera* in Brazil in 2012 and consequential spread has led to complications in identification of the different *Helicoverpa* spp., with hybridisation occurring between *H. armigera* and *H. zea* (Anderson *et al.,* 2018, Leite *et al.,* 2014, Pomari-Fernande *et al.,* 2015). An up-to-date distribution can be found on the European and Mediterranean Plant Protection Organization's (EPPO) Global database (Helicoverpa armigera (HELIAR)[World distribution]| EPPO Global Database). *Helicoverpa armigera* has achieved this wide distribution because of its impressive natural dispersal abilities, highly polyphagous nature and movement within the trade of plants and plant products.

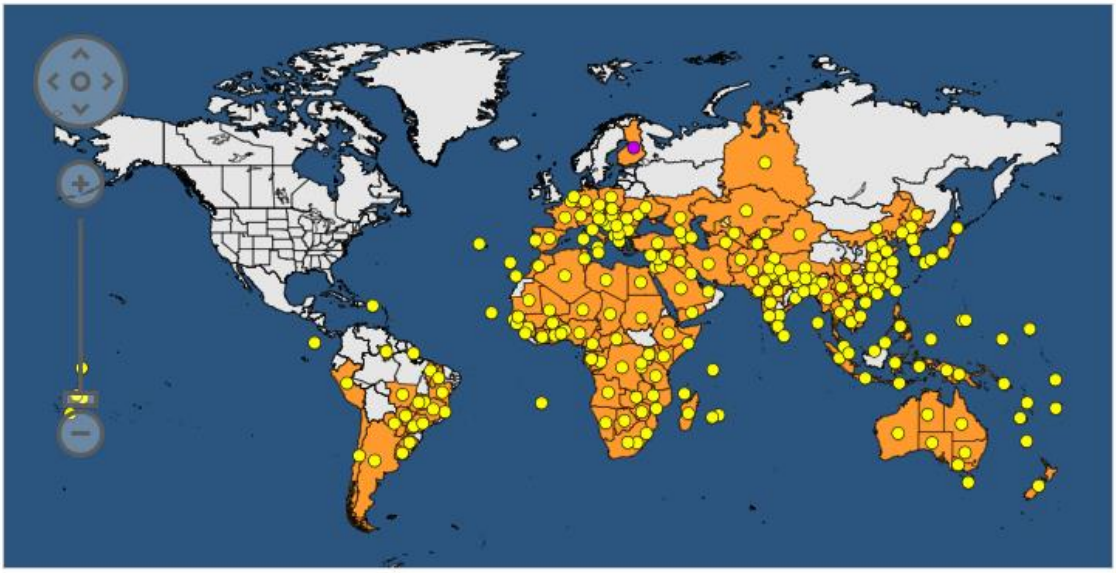

Figure 1. Worldwide distribution of *Helicoverpa armigera*, downloaded on 09/04/2025 (EPPO 2025).

Hosts

The host range of *H. armigera* extends across the Asteraceae, Fabaceae and Poaceae families with significant hosts being *Capsicum annuum* (bell pepper), *Chrysanthemum, Dianthus caryophyllus* (carnation), *Pelargonium*, *Solanum lycopersicum* (tomato), *S. tuberosum* (potato) and *Zea mays* (maize) (EFSA 2014, EPPO 2024). A comprehensive host list is compiled on EPPO's Global database

(Helicoverpa armigera (HELIAR)[Host plants]| EPPO Global Database). Outbreaks in GB have previously occurred under protection on *Chrysanthemum* and *Pelargonium*, which originated from infested cuttings, and outdoors on *Z. mays* initiated by natural dispersal.

Life cycle

During the oviposition period, adult females lay eggs on a range of plants. This lasts between 5-24 days, and individuals have been recorded as laying over 3,000 eggs although between 700 and 2,200 is more typical (EFSA 2014). At temperatures of 25ºC, eggs can hatch within three days, but as temperatures reduce this can extend to 11 days. Larvae then feed on their host and develop through a number of instars, with development time dependent on both temperature and the nutritional quality of the host (EFSA 2014). Following pupation in the soil, nocturnal adults emerge. Adult moths can migrate over long distances assisted by the wind. *Helicoverpa armigera* is a regular migrant into GB, with adults reported as far north as Shetland and individuals have been recorded as travelling as far as from southern Europe to the UK (EPPO 2024).

GB Legislation

Helicoverpa armigera is listed in Annex 2, Part A of the assimilated Phytosanitary Conditions Regulation (EU) 2019/2072[1]. Annex 2, Part A is the list of GB quarantine pests that are not known to occur in GB and as such they are prohibited from being introduced into, moved within or held, multiplied or released into GB. Import requirements relating to *H. armigera* are summarised in Table 1. Two further *Helicoverpa* spp. are listed in Annex 2, Part A of the legislation: *H. assulta* and *H. zea*.

[1] Commission Implementing Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019

Table 1. Specific import requirements relating to *Helicoverpa armigera* listed in Annex 7, Part B of the assimilated Phytosanitary Conditions Regulation (EU) 2019/2072.

Plants for planting, other than seeds, of *Chrysanthemum* L. *Dianthus* L. and *Pelargonium* l'Hérit. ex Ait.	Any third country	The plants must be accompanied by: (a)an official statement that they originate in an area* established by the national plant protection organisation in accordance with ISPM4 as an area that is free from *Helicoverpa armigera* (Hübner) and *Spodoptera littoralis* (Boisduval), (b)an official statement that 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 (c)an official statement that the plants have undergone appropriate treatment** to protect them from those pests. * The name of the area(s) must be included in the phytosanitary certificate under the heading “Additional declaration”. ** The active ingredient, concentration and date of application of these treatments must be mentioned on the phytosanitary certificate under the heading “disinfestation and/or disinfection treatment”.

EU Legislation

Helicoverpa armigera was originally regulated in Annex I A, Section II of Council Directive 2000/29/EC in the EU. However, following the Report of Pest Risk Analysis in 2007, it was concluded that the phytosanitary import measures no longer provided protection to southern and central EU countries due to the presence of the pest there (Lammers & MacLeod 2007). Only northern EU countries were potentially benefiting

from the measures to protect glasshouses, however outbreaks in glasshouses were primarily associated with infested cuttings and not associated with the pathway of infested produce and unlikely a result of natural spread or migration. As a result of this report, there was a policy shift to regulate *H. armigera* in Annex II A, Section II which permitted action on specified hosts for pests which were present in the EU and no action being taken on produce or cut flowers infested with *H*. *armigera*. *Helicoverpa armigera* has since been deregulated in the EU.

Statutory action in GB

From January 2021, statutory action was required in GB on all findings of *H*. *armigera*. Prior to January 2021, statutory action was not required if this species was detected on produce as it was listed in Annex II A, Section II of the EU regulations, so action was only required on specified hosts in the legislation. At the time these were “Plants of *Dendranthema* (DC) Des Moul, *Dianthus* L., *Pelargonium* l‘Hérit. ex Ait. and of the family *Solanaceae*, intended for planting, other than seeds”.

At Plant Health Risk Group (PHRG), a decision-making group in Defra plant health, this change in statutory action was raised as an issue in April 2022, and it was agreed that consignments of non-planting material infested with *H*. *armigera* would be permitted to move to retail sites, if repacking of the produce does not occur and as long as movement to protected horticulture sites is prevented. A conditional release notice issued by the inspector ensures these conditions are met. This was deemed the most proportionate course of action with the phytosanitary risk from infested produce being low and with statutory destruction still recommended when *H*. *armigera* is identified on plants for planting, which was in line with the 2007 report of a pest risk analysis for *H*. *armigera* (Lammers & MacLeod 2007).

The risk posed by *H*. *armigera*

Damage is primarily caused by the larvae of *H*. *armigera* which feed on most above ground parts of its host plants, with a particular preference for the reproductive parts of the plants such as buds, flowers, seed pods and fruit. This is particularly problematic when crops are grown for their fruit, or the seed is relied upon for future growing seasons. When larvae bore into plant tissues, the holes formed and associated damage can provide opportunities for secondary infection.

The main threat posed by this species to GB is to protected cultivation, it is unlikely the species will be able to establish outdoors in GB and other northern European countries (Lammers & MacLeod 2007). *Helicoverpa armigera* has only established in southern parts of the EPPO region where it can overwinter, with only transient populations found in northern parts (EPPO 2024).

In the EU, damage from *H. armigera* has been reported across three broad situations: i) protected cultivation through trade, ii) outdoor crops by immigration and iii) outdoor crops where overwintered populations are supplemented by migrants (EFSA 2014). In GB situations i) and ii) are likely to occur, with warmer summers favouring ii). Previously in GB, *H. armigera* has caused damage to *Pelargonium* and *Chrysanthemum*, with damage being significant if the populations were allowed to build up. This can, however, be mitigated by insecticide applications, removal of larvae and disposal of infested plants (Lammers & MacLeod 2007). Further control measures which are available are detailed later in this review. Although *Pelargonium* and *Chrysanthemum* are not as widely grown commercially as they once were, there is still believed to be a small industry for them (Pers Comms). In the EU, damage has been reported to tomato crops both under protection and outdoors, therefore the GB tomato industry could be at risk from imports with eggs/larvae or natural migrants entering glasshouses. However, at present this is more of a theoretical risk for commercial glasshouses because it is not known to have been a problem in the UK, nor has it been reported to be a glasshouse pest of tomatoes in northern Europe. Commercial tomato production sites do not have mesh covered vents to prevent moths entering glasshouses as these would reduce the efficacy of ventilation (Pers Comms). Outdoor crops can be damaged by *H. armigera* adults migrating naturally to GB and breeding in later summer, however populations are not thought to be able to reach significantly damaging levels due to a limit on the number of generations with arrivals being later in the year. Therefore, the main risk posed by *H. armigera* is from eggs or larvae arriving on cuttings or migratory adults entering protected settings and laying eggs early enough in the season for enough generations to occur for damaging population levels.

Interceptions in England and Wales

In England and Wales, *H. armigera* is a frequently intercepted species on plants and plant products. Records of diagnoses of *H. armigera* from the six-year period from 1st January 2019 until 31st December 2024 have been downloaded from Fera's diagnosis database (Annex A). The majority of the interceptions of *H. armigera* are of caterpillars and occur on edible produce, such as sweetcorn, asparagus and peppers. On this pathway there is a low risk of the pest completing development and finding a suitable host to lay eggs on. This pathway is followed by cut flowers then finally plants for planting, with findings on plants for planting only occurring in recent years on *Alstroemeria* and *Mentha* (mint).

Outbreaks in England and Wales

In the late summer of 2024, there were two findings of *H. armigera* larvae in growing crops of *Zea mays* (maize) in England, one in Dorset and one in Worcestershire. These are believed to have hatched from eggs laid in the maize crops by a migrant

adult from the continent. In both situations the crop was permitted to be harvested due to the low phytosanitary risk posed by the species. As the establishment of the pest is not expected outdoors, the growers were permitted to either send waste from the harvest to a biodigester or plough it in and incorporate it back into the field.

Outbreaks of *H. armigera* have not been reported under protection in GB for at least a decade. When outbreaks have occurred under protection, they have been at specialist growers of ornamentals such as *Pelargonium* and *Chrysanthemum*. No outbreaks have been detected in commercial tomato glasshouses in the UK. The source of outbreaks in protected *Pelargonium* and *Chrysanthemum* crops have been infested imported cuttings. If such outbreaks go undetected for an extended period of time, significant damage can occur in ornamental crops under protection. However, with good cultural control, monitoring and targeted use of biocontrol agents, biopesticides and conventional pesticides, eradication can be achieved effectively in these environments. Example control options are discussed in more detail in the following section.

Options

Three options for the future regulatory status of *H. armigera* are discussed:

a) maintaining the current regulatory status as a quarantine pest in Annex 2 Part A,

b) regulating as a regulated non-quarantine pest in Annex 4 Part C or

c) deregulating *H. armigera*.

Option A: Retain *H. armigera* as a Quarantine Pest in Annex 2, Part A

This option would require no legislative changes and the requirements in Table 1 would remain as *H. armigera* would continue to be a quarantine pest. Below, *H. armigera* is assessed against the four QP criteria.

1. **Identity of the pest**

Helicoverpa armigera has a clearly defined taxonomy and meets this criterion.

2. **Presence of the pest in the territory of concern (pest absent)**

The official pest status of *H. armigera* is absent.

Although not present all year round, the pest is a regular migrant to GB, with over 11,000 records on the National Biodiversity Network Atlas website. So, there is an argument for its presence even though it does not overwinter in GB. According to International Standards for Phytosanitary Measure (ISPM) 8 on Determination of pest status in an area, ‘Present: transient’ is defined as “the pest is present but the

evidence supports the conclusion that the pest is not expected to establish because conditions (e.g. hosts, climates) are not suitable for establishment or appropriate phytosanitary measures have been applied" (IPPC 2021). Therefore, a pest status of 'present: transient' is probably a better reflection of the presence of *H. armigera* in GB.

This criterion is met by the current pest status of *H. armigera*, but this could be debated and would not be met if the pest status was changed to present: transient.

3. **Capability of entry, establishment and spread of the pest in the territory in question**

The migratory nature of the adult moth means that there are no feasible and effective measures to prevent entry of the pest. *Helicoverpa armigera* regularly enters GB, particularly during the late summer when population levels on continental Europe increase. However, despite these regular appearances it has not become established. For recent outbreaks in maize crops, it has been advised that crops can be harvested, and produce has been permitted to move to retail, wholesale or for food processing in GB under a conditional release notice. It has also been advised that any remaining waste from the crop should be either sent to a biodigester or ploughed back into the field due to the limited risk *H. armigera* poses to outdoor cultivation. It is thought that even without these measures in place, establishment of the pest outdoors would not have occurred.

Helicoverpa armigera is likely to be able to establish under protection in GB. If heated overwinter, establishment would be favoured when a suitable growing media is present over winter for pupation to occur, which may not be present in hydroponic systems or those which are cleaned out over the winter. If infected cuttings were to arrive at a commercial site producing cut flowers or potted plants for sale, onwards movement to another commercial production site is unlikely to occur. In winter the use of supplementary artificial light could increase the risk of adult of moths transferring between protected facilities, however favourable temperatures for flight have been reported from 20ºC to 24ºC, which are unlikely to occur when supplementary light is required (Huang & Hao 2020). Therefore, spread from one protected environment to another is unlikely.

This criterion is not met as establishment outdoors and spread from one protected environment to another are both considered unlikely.

4. **Potential economic, social and environmental impact**

Helicoverpa armigera arrives in GB by natural migration every summer, after which it has the potential to cause damage to field grown crops such as *Z. mays*. However, as populations need to build up on continental Europe first, a migrating adult needs to lay eggs on a crop and then these need to develop, it is therefore unlikely that the

necessary number of generations can be completed for significant impacts to occur outdoors.

Helicoverpa armigera is more likely to have an impact on a small number of protected ornamental growers if it was to arrive on cuttings imported early in the growing season. There are control options available in these situations which are outlined in annex B.

This criterion is not met due to the reduced number of expected generations outdoors and restricted industry which it could impact.

Option A: Conclusion

The climate in GB is thought to be unsuitable for overwintering of *H. armigera*, therefore it is unlikely it will establish outdoors all year round and spread year on year. This has been demonstrated by the continued arrival but lack of establishment to date. Instead, continued arrivals and localised outbreaks are predicted to occur in late summer months as adult moths are carried by southerly winds from Europe. Populations of *H. armigera* will then die off as they fail to overwinter. This species is also: unlikely to spread between protected environments, cannot be considered categorically absent and it is unlikely to cause a significant economic, social or environmental impact. Therefore, based on this assessment against the criteria of a QP, remaining a QP is not the most appropriate regulatory status for this pest.

Option B: Regulate *H. armigera* as an RNQP in Annex 4, Part C: RNQPs concerning propagating material of ornamental plants and other plants for planting intended for ornamental purposes

Below, *H. armigera* is assessed against the six RNQP criteria.

1. **The taxonomic identity of the pest shall be clearly defined or, alternatively, the pest shall have been shown to produce consistent symptoms and to be transmissible.**

Helicoverpa armigera has a clearly defined taxonomy and meets this criterion.

2. **The pest must be present in the GB territory.**

The official pest status of *H. armigera* is absent.

Although not present all year round, the pest is a regular migrant to GB, with over 11,000 records on the National Biodiversity Network Atlas website. So, there is an argument for its presence even though it does not overwinter in GB. According to International Standards for Phytosanitary Measure (ISPM) 8 on Determination of pest status in an area, ‘Present: transient’ is defined as “the pest is present but the evidence supports the conclusion that the pest is not expected to establish because

conditions (e.g. hosts, climates) are not suitable for establishment or appropriate phytosanitary measures have been applied" (IPPC 2021).

This criterion is not met with the current pest status of *H*. *armigera*, but this could be debated, as the pest is a regular summer migrant to the GB.

3. **The pest is not a quarantine pest or a pest that meets the criteria of a quarantine pest if not yet listed.**

Helicoverpa armigera is listed as a GB quarantine pest in Annex 2, Part A of the assimilated Phytosanitary Conditions Regulation (EU) 2019/2072. It does not currently fulfil all the criteria to be a quarantine pest as outlined in option A.

Although currently a quarantine pest, it does not fulfil the criteria to be one, so this criterion is met.

4. **The transmission of the pest shall be assessed to take place mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects.**

The primary mode of transmission/dispersal of *H*. *armigera* into GB as a whole is via natural spread due to the migratory nature of the pest, frequently arriving in late summer. *Helicoverpa armigera* is also regularly intercepted on plant products, however there is a lack of a pathway from plant products such as sweetcorn, asparagus and peppers for consumption to a suitable host in a protected ornamental setting. Although only occasional findings are made on cuttings, these are considered the most likely route of introduction into protected ornamental crops such as *Chrysanthemum* or *Pelargonium*.

In the EU's 2018 assessment of *H*. *armigera* in 2018 where *H*. *armigera* was assessed as a candidate RNQP in the ornamental sector on *Chrysanthemum*, *Dianthus*, *Pelargonium* and Solanaceae, and the seed potato sector on *Solanum tuberosum*. The assessments for the ornamental sector concluded that plants for planting was not a significant pathway and for seed potatoes these were also not considered a significant pathway (EPPO 2024).

This criterion is tentatively met for protected ornamentals, although outbreaks have not occurred in protected ornamentals for over a decade and interceptions on this pathway are uncommon which raises uncertainty if this is the main pathway. Due to the scale of migration from continental Europe in late summer transfer from an outdoor crop into a protected ornamental site is possible.

5. **Infestations of the plants for planting with the pest shall have an unacceptable economic impact on the intended use of those plants.**

Helicoverpa armigera could arrive in association with plants for planting destined for protected cultivation such as cuttings of *Chrysanthemum*, *Dianthus*, *Pelargoniums* or other ornamentals. If populations were to develop on these plants early in the growing season without any treatment, impacts would be observed. This criterion is met, however there has been a significant reduction in the industries which are growing such ornamentals, particularly Chrysanthemums, and control options are available.

This criterion is met, although the size of this sector is believed to be considerably smaller than it once was, so the magnitude of the impact is uncertain.

6. **Feasible and effective measures are available to prevent its presence on the plants for planting concerned.**

Feasible and effective measures are available, including a pest free production site and seed testing (EPPO, 2024a).

The pest meets this criterion.

Option B: Conclusion

The official status of *H. armigera* in GB is absent from GB, however a status of 'Present: transient' is concluded to be much more appropriate for this species. The main pathway for establishment in outdoor crops in GB is by natural dispersal. However, the primary mode of transmission into protected ornamentals could be infected plants for planting, although uncertainty around this is raised. Therefore, with some uncertainty due to: the official pest status, the size of the industry and the main transmission pathway, *H. armigera* tentatively meets the RNQP criteria on protected ornamentals.

Option C: Deregulate *H. armigera* from the assimilated Phytosanitary Conditions Regulation (EU) 2019/2072.

Helicoverpa armigera fails to meet the criteria of either a quarantine or a regulated non-quarantine pest. Consequently, the deregulation of *H. armigera* may be the most appropriate legislative next step for this species. If *H. armigera* was to be deregulated in GB, statutory action would no longer be required on any findings including on imported plants for planting, plant products and in outdoor crops. If the pest were to arrive in any setting, the management of it would be down to industry.

If statutory action on plant products infested with *H. armigera* stopped, this would permit a faster flowing trade of plant products infested with a pest which poses a low phytosanitary risk to GB. The restrictions currently placed on these plant products staying within GB for retail, wholesale or food processing would also be lifted. This could be particularly beneficial for the onward movement of plant products to

Northern Ireland where the pest is not regulated because the plant health requirements of Northern Ireland remain aligned with the EU. This onward movement if infested with *H. armigera* is currently restricted due to its regulatory status in GB.

Deregulation would also result in no action taken in field outbreaks of *H. armigera*, this would also help facilitate the movement of the harvested produce without the movement having to be carried out under a conditional release notice. Restrictions would also not be in place on any remaining crop waste or residues so the grower could utilise this as they see fit. The removal of these controls is not predicted to increase the likelihood of *H. armigera* establishing in GB, with the unsuitable climate being the reason for the lack of establishment potential. Transient populations of *H. armigera* are predicted to continue to occur in late summer in future years, particularly in southern England and especially in years with higher population pressures in continental Europe.

If *H. armigera* is deregulated and management is left to industry, or *H. armigera* is made an RNQP, being aware of the available control options is important. If left to industry this would be akin to two other migratory species which cause damage in GB during the summer months: *Plutella xylostella* (diamond-back moth) and *Autographa gamma* (silver Y moth), similar threats which industry already manage. Available control options are discussed in Annex B.

In recent years, interceptions of *H. armigera* on plants for planting have been infrequent, but deregulation would also mean that no action would be taken on findings of *H. armigera* on imported plants for planting. Therefore, there is a possibility that *H. armigera* could enter protected environments via this pathway. If not detected early, damage could occur, but once identified there are a range of available control measures which can be utilised by growers to assist in the eradication of this pest.

Option C: Conclusion

The deregulation of *H. armigera* is a suitable next regulatory step for this pest because of the significant benefits associated with the removal of restrictions which are currently in place when findings of *H. armigera* are made in trade and in outdoor situations. However, removing all restrictions related to *H. armigera* will result in an increased likelihood of the pest arriving on plants for planting which could enter protected environments.

Conclusion

Helicoverpa armigera is currently regulated as a quarantine pest in GB. Since 2021, statutory action has been taken on all findings of this pest including those on imported non-planting material. Statutory action is also required on outbreaks in

outdoor crops despite establishment outdoors not thought to be likely and impacts on outdoor crops expected to be limited. The industry which is at risk from *H. armigera* in GB is protected ornamental cultivation, therefore taking statutory action on all findings of *H. armigera* including those on non-planting material and in outdoor crops is not the best approach for protecting this industry nor proportional to the overall phytosanitary risk posed by *H. armigera* in GB.

Helicoverpa armigera no longer meets the criteria to be a GB quarantine pest, primarily due to the unsuitable climate in GB for establishment outdoors and the main pathway for arrival being natural dispersal for which there is no feasible nor effective mitigation strategy. *Helicoverpa armigera*, with some uncertainty, fulfils the criteria to become an RNQP in protected ornamentals. This is uncertain because the protected ornamental sector which would potentially benefit from listing *H. armigera* as an RNQP is believed to be significantly reduced from what it once was, therefore the impact is expected to be low. There is also uncertainty that the main transmission pathway is plants for planting as the pest is a frequent summer migrant to GB. The deregulation of *H. armigera* would bring significant benefits such as alleviating the burden on trade in plant products which may be infested with *H. armigera* which poses a low phytosanitary risk. Trade could continue without the need for conditional release notices restricting the movement of goods. Likewise inevitable transient populations of the pest in outdoor crops would not result in restrictions on the harvested crop or associated waste. Deregulation would, however, result in a small increased risk of the pest entering protected ornamental crops in association with cuttings. The increase would be low because the current inspection regime does not cover 100% of consignments with a proportion of consignments inspected at the border. When importing propagating material UK growers would also be unlikely to purchase from suppliers who repeatedly send infested plants. If *H. armigera* infested consignments were to arrive at a protected site, growers are likely to be aware of this well-known pest and have several control options available to them.

Therefore, based on this review, the deregulation of *H. armigera* is deemed the most appropriate next regulatory step for this pest.

This review has been undertaken taking into account the environmental principles laid out in the Environment Act 2021. Of particular relevance are:

- The prevention principle, which means that any policy on action taken, or not taken should aim to prevent environmental harm.
- The precautionary principle, which assists the decision-making process where there is a lack of scientific certainty.

References

Anderson CJ, Oakeshott JG, Tay WT, Gordon KHJ, Zwick A & Walsh TK (2018): Hybridization and gene flow in the mega-pest lineage of moth, Helicoverpa. *Proc Natl Acad Sci U S A* **115**, 5034-5039.

EFSA (2014): Scientific Opinion on the pest categorisation of Helicoverpa armigera (Hübner). *EFSA Journal* **12**, 3833.

EPPO (2024) *Helicoverpa armigera*. Available at: https://gd.eppo.int (accessed 03/09/2024.

EPPO (2025) EPPO Global Database Distribution. Available at: https://gd.eppo.int/taxon/HELIAR/distribution (accessed 09/04/2025.

Huang J & Hao H (2020): Effects of climate change and crop planting structure on the abundance of cotton bollworm, Helicoverpa armigera (Hubner) (Lepidoptera: Noctuidae). *Ecol Evol* **10**, 1324-1338.

IPPC (2021) Determination of pest status in an area. International Standard for Phytosanitary Measures No. 8. FAO on behalf of the Secretariat of the International Plant Protection Convention., Rome.

Kriticos DJ, Ota N, Hutchison WD, Beddow J, Walsh T, Tay WT, Borchert DM, Paula-Moreas SV, Czepak C & Zalucki P (2015): The Potential Distribution of Invading Helicoverpa armigera in North America: Is it Just a Matter of Time? *PLoS One* **10**.

Lammers JW & MacLeod A (2007) Report of a Pest Risk Analysis Helicoverpa armigera (Hübner, 1808). Plant Protection Service (NL) and Central Science Laboratory (UK).

Leite NA, Alves-Pereira A, Correa AS, Zucchi MI & Omoto C (2014): Demographics and genetic variability of the new world bollworm (Helicoverpa zea) and the old world bollworm (Helicoverpa armigera) in Brazil. *PLoS One* **9**, e113286.

Pomari-Fernande A, de Freitas Bueno A & Ricardo Sosa-Gómez D (2015): *Helicoverpa armigera*: current status and future perspectives in Brazil. *Current Agricultural Science and Technology*, 1-7.

Annex A – Diagnosis data

Table A1. Diagnoses of *Helicoverpa armigera* by Fera Science Ltd covering diagnoses in England and Wales from January 2019 – 2024. The table includes diagnoses on imports at outbreak sites. PfP: Plants for planting; cf: Cut flowers.

Host	2019	2020	2021	2022	2023	2024	Total	Type
Alstroemeria					1		1	PfP
Asparagus officinalis					4	6	10	Edible
Capsicum	8	3	3	2	1	2	19	Edible
Cicer arietinum				1			1	Edible
Dianthus						2	2	cf
Fragaria ananassa (*F. x ananassa*)					1		1	Edible
Gypsophila	1						1	cf
Ipomoea aquatica				1			1	Edible
Lactuca sativa var. *crispa*				1			1	Edible
Matthiola				1			1	cf
Mentha				1			1	PfP
Momordica charantia				1		1	2	Edible
Ocimum basilicum						1	1	Edible
Phaseolus vulgaris			1				1	Edible

Pisum sativum			2	1	1	2	6	Edible
Rosa alba hybrids			1				1	cf
Rubus				1			1	Edible
Solanum aethiopicum				1			1	Edible
Solanum lycopersicum					1		1	Edible
Solanum melongena	1	2	3	2			8	Edible
Solanum torvum			1		1		2	Edible
Zea mays	5	1	1	1	1	4	13	Edible
All hosts	15	6	12	14	11	18	76	Mixed

Table A2. Summary of interceptions presented in Table A1 of *Helicoverpa armigera* by commodity type 2019-2024.

Commodity type	Number of interceptions (2019-2024)
Cut flowers	5
Edible	69
Plants for planting	2

Annex B - Available control options

Cultural control and monitoring

Monitoring for signs of the pest when crop walking is important to aid early detection. Growers are advised to remain vigilant for eggs and early instar larvae on leaves particularly on recently imported plants. Removing these by hand and destruction of damaged plants can be effective. When early instar larvae develop, they tend to penetrate fruit which can make detection more difficult, but fruit with entrance/exit wounds should be cut open and examined for the presence of pests. Monitoring through the use of traps can also be an effective way to aid the early detection of *Helicoverpa* sp. in a growing crop as adults are more active at night. This can be done through light traps or pheromone traps, many of which are available for purchase with pheromones often targeting male moths.

Biological control and biopesticides

The application of biological control agents can be an effective way of reducing pest numbers to a manageable level. The active *Bacillus thuringensis kurstaki* ABTS-351, a bacterium which can control Lepidopteran larvae through toxins produced in the larvae's gut. This active is registered for use in a range of crop situations including many protected crops and ornamental plant production.

Trichogramma are parasitic wasps which are commonly used as a biocontrol product. Female wasps parasitise eggs of many Lepidopteran species including *Helicoverpa* spp. Once parasitised, this prevents the emergence of caterpillars from these eggs and consequential crop damage.

Steinernema carpocapsae is an entomopathogenic nematode, which can be effective in both protected and outdoor settings for controlling caterpillars. The nematodes enter the pest and release symbiotic bacteria into the larval tissue which break down the larva providing food for both the nematode and bacteria.

Conventional chemistry

A range of conventional pesticides are also available which control *Helicoverpa* spp. *Helicoverpa armigera* has been widely reported to develop resistance to pesticides, particularly synthetic pyrethroid insecticides (EFSA 2014). Therefore, alternative methods of control and eradication should be favoured first and no one active or mode of action should be continually relied on to reduce the risk of resistance developing.

The active deltamethrin is available for use on some protected crops, and extension of authorisation for minor use's (EAMUs) are in place for products which can be used on protected ornamentals. A number of EAMUs are available for products containing the active lambda-cyhalothrin for a range of protected settings including some crops

and ornamentals. Products containing spinosad are also approved for some protected crops and protected ornamental plant production. Many of these products are broad spectrum and would not be compatible with biological control agents. These actives stated have had their product approvals checked at the time of writing however can be withdrawn at any time and should be checked on the Health and Safety Executive’s website prior to application. All instructions on product labels and off labels should be followed. If products have not been used on the affected plants before, it would be advisable to treat a limited number of plants first to test for phytotoxicity.