Netherlands Food and Consumer Product Safety Authority
*Ministry of Economic Affairs*

National Plant Protection Organization, the Netherlands

## Quick scan number: QS. Ent/2014/10

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| | **Quick scan date**: 9 January 2015 | |
| 1 | What is the scientific name (if possible up to species level + author, also include (sub)family and order) and English/common name of the organism? *Add picture of organism/damage if available and publication allowed*. | *Chloridea subflexa* (Guenée, 1852) (Pogue 2013) (Lepidoptera: Noctuidae)<br>Synonyms: *Aspila subflexa, Heliothis subflexa* (Guenée, 1852), *Aspila subflexa* (Guenée, 1852) |
| 2 | What prompted this quick scan? *Organism detected in produce for import, export, in cultivation, nature, mentioned in publications, e.g. EPPO alert list, etc.* | Findings of fully grown larvae on fruits of *Physalis ixocarpa* (Solanaceae) imported from Mexico on August 27 (one dead larva) and on September 8 (one living larva). |
| 3 | What is the current area of distribution? | North-, Central- and South-America: *Chloridea subflexa* is widely distributed in the Western Hemisphere from the prairie provinces in the USA to the east coast of southern Canada, in Central and South America, except in Chile and southern Argentina. It also occurs throughout the Caribbean islands. Northern records in the USA represent seasonal migrants. The genus is absent from the Pacific Northwest (Pogue 2013). |
| 4 | What are the host plants? | *C. subflexa* (Guenée) is an oligophagous pest feeding on Solanaceae (Pogue 2013). It feeds primarily on *Physalis* spp., only rarely on *Solanum*, and not on other hosts (Wagner et al. 2011). Therefore, records of *Nicotiana, Delonix* (fam. Leguminosae) and *Rhexia* (fam. Melastomataceae) (Robinson et al. 2010) need verification. Zambrano (2013) reports two interceptions of *C. subflexa* on *Capsicum* fruit from Mexico between 1984 and 2010. These findings, however, are no proof that larvae actually feed on *Capsicum*. No records were found of the species actually feeding on *Capsicum* or *Solanum* spp.. |

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| 5 | Does the organism cause any kind of plant damage in the current area of distribution and/or does the consignment demonstrate damage suspected to have been caused by this organism?<br>*Yes/no + plant species on which damage has been reported + short description of symptoms.*<br>*Please indicate also when the organism is otherwise harmful (e.g. predator, human/veterinary pathogen vector, etc.).* | *C. subflexa* feeds exclusively on the fruit (Benda et al. 2011). According to the inspector, the consignment of the second finding showed relevant damage, likely to have been caused by caterpillars. It was intended for export outside Europe but rejected by the exporter for quality reasons.<br><br>In Argentina, *C. subflexa* was found the most harmful pest species on two *Physalis* species in field trials because of its damage to the fruit (Bado et al. 2005). It is considered an occasional pest of tomatillo (*Physalis* spp.) in Mexico (Pogue 2013). See also remarks under # 12. |
| 6 | Assess the probability of establishment in the Netherlands (NL) (i.e. the suitability of the environment for establishment).<br>a. In greenhouses (low, medium, high)<br>b. Outdoors (low, medium, high)<br>c. Otherwise (e.g. storage facilities, human environment) | The probability of establishment in greenhouses is high if host plants would be present. The probability of establishment outdoors is low given the climate and the limited presence of the preferred host plants (*Physalis* spp.). In absence of *Physalis* spp., the organism might feed and reproduce on *Solanum* spp. in stead. *S. nigrum* has for example been reported as a host plant (Robinson et al., 2010) a species which is widely present in the Netherlands (but this is highly uncertain). (Local) transient populations outdoors may occur if the species would become established in warmer areas in Europe. These transient populations are expected to be local because of the limited presence of *Physalis* spp. |
| 7 | Assess the probability of establishment in the EU (i.e. the suitability of the environment for establishment). | The probability of establishment in the EU is estimated high: the climate in southern Europe is suitable and host plants are present (e.g. as an ornamental in gardens). |
| 8 | What are the possible pathways that can contribute to spread of the organism after introduction? How rapid is the organism expected to spread (by natural dispersal and human activity)? | It is assessed that the species can rapidly spread after introduction. The adults are good flyers and are known for their migratory behaviour (Wagner 2012). Young larvae may be overlooked easily in consignments due to their hidden lifestyle (see question 9). Eggs are laid on the leaves and pupation takes place outside the fruits and these life stages will normally not be present on fruits. They may be present on plants for planting of host plants. Both pathways (natural and human assisted spread) will support rapid spread after introduction. |
| W | Provide an assessment of the type and amount of direct and indirect damage (e.g. lower quality, lower production, export restrictions, threat to biodiversity, etc.) likely to occur if the organism would become established in NL and the EU, respectively? | As far as known, *Physalis* spp. are (mainly) grown as ornamental in the EU. Damage cause by *C. subflexa* can lower the ornamental value of *Physalis* spp. Caterpillars feed on the fruit and are therefore difficult to control (Oppenheim & Gould 2002). *C. subflexa* is not known to be on any quarantine list. |
| 10 | Has the organism been detected on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables)? | Yes |

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| | *If "no", go to question 12* | |
| 11 | If the organism has been found on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables), what is the probability of introduction (entry + establishment)?<br>*Only to be answered in case of an interception or a find.* | The probability of introduction is considered low: import of solanaceous plants for planting is prohibited in the EU and consignments with fruits are transported directly to retailers. The probability of introduction will be higher if consignments would be stored in the near vicinity of host plants for prolonged periods of times allowing caterpillars to leave the fruit, pupate and mate. |
| 12 | Additional remarks | • The specialist *C. subflexa* shows a higher genetic variability between populations than e.g. the generalist *C. virescens* (Groot et al. 2011), a pest on many agricultural crops including cotton, tomato, soybean, tobacco, garbanzo bean and alfalfa (Graham & Robertson 1970; Waldvogel & Gould 1990; Blanco *et al* . 2007).<br>• *C. subflexa* (Guenée) and *C. tergemina* (Felder & Rogenhofer) are both oligophagous on Solanaceae and are sister species in a separate clade from *C. virescens* (Fabricius) (Poole *et al*. 1993). Both species are considered minor pests that feed on Solanaceae: *C. tergemina* is a pest on tobacco in Venezuela and Colombia and *C. subflexa* is an occasional pest of tomatillo (*Physalis* spp.) in Mexico. |
| 13 | References | • Ayala Sifontes JL (1982) *Heliothis subflexa* Guenee: a new species for Cuba. Centro Agricola 9(1): 101-104.<br>• Bado SG, Cerri AM, Vilella F (2005) Insectile fauna associated with two species of *Physalis* (Solanaceae) cultures in Argentine. Boletin de Sanidad Vegetal, Plagas; 2005. 31(3):321-333.<br>• Benda ND, Brownie C, Schal C, Gould F (2011) Field observations of oviposition by a specialist herbivore on plant parts and plant species unsuitable as larval food. Environmental Entomology 40(6): 1478-1486.<br>• CABI (2014) Crop Protection Compendium online. CAB International, Wallingford, UK. http://www.cabi.org.ezproxy.library.wur.nl/cpc/datasheet/26773 [acc. Sep. 10, 2014]<br>• Gilligan TM, Passoa SC (2014) LepIntercept, An identification resource for intercepted Lepidoptera larvae. Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. [acc. Sep 10 at www.lepintercept.org].<br>• Groot AT, Classen A, Inglis O, Blanco CA, Lopez J Jr, Teran Vargas A, Schal C, Heckel DG, Schofl G (2011) Genetic differentiation across North America in the generalist moth *Heliothis virescens* and the specialist *H. subflexa*. Molecular Ecology 20(13): 2676-2692.<br>• Moraes CM, de Mescher MC (2004) Biochemical crypsis in the avoidance of natural enemies by an insect herbivore. Proceedings of the National Academy of Sciences of the United States of America 101(24): 8993-8997.<br>• Oppenheim SJ, Gould F (2002) Behavioral adaptations increase the value of enemy-free space for |

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| | | *Heliothis subflexa*, a specialist herbivore. Evolution 56(4): 679-689.<br>• Pogue MG (2013) Revised status of *Chloridea* Duncan and (Westwood), 1841, for the *Heliothis virescens* species group (Lepidoptera: Noctuidae: Heliothinae) based on morphology and three genes. Systematic Entomology 38: 523–542<br>• Robinson GS, Ackery PR, Kitching IJ, Beccaloni GW & Hernández LM (2010) HOSTS - A database of the world's Lepidopteran hostplants. NHM, London. http://www.nhm.ac.uk/hosts. [acc. Sep 10, 2014]<br>• Wagner DL, Schweitzer DF, Bolling Sullivan J, Reardon RC (2012) Owlet Caterpillars of Eastern North America. Princeton University Press, Princeton.<br>• Zambrano GA. USDA-APHIS-CPHST (2013) Importation of Fresh Pepper Fruit – *Capsicum annuum* L., *Capsicum baccatum* L., *Capsicum chinense* Jacq., *Capsicum frutescens* L., and *Capsicum pubescens* Ruiz & Pav. – from Ecuador into the United States. Jan. 16, 2013, Version 3 (Draft). |
| 14 | **Conclusions** | One living larva of *Chloridae subflexa* was intercepted on fruits of *Physalis ixocarpa* imported from Mexico. Fruits of *Physalis* spp. are non-regulated products in the EU (i.e. no requirement for a phytosanitary certificate and import inspection) and infested consignments may enter unnoticed. The organism has been reported to feed primarily on *Physalis* spp. and rarely on other Solanaceae. It can cause damage to fruits of *Physalis* spp. but no data were found on commercial production of *Physalis* fruit in the EU. The fruit on which the larva was found was intended for consumption and, therefore, the probability of introduction with import of fruit is considered low. The overall risk (probability x impact) is assessed 'low'. |
| 15 | **Follow-up measures** | The consignment was released |