

Chrysodeixis includens (Lepidoptera: Noctuidae)

This short description has been prepared in the framework of the EPPO Study on Pest Risks Associated with the Import of Tomato Fruit. The whole study can be retrieved from the EPPO website.

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Africa	Asia	Oceania	North America	South-Central America and Caribbean
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Chrysodeixis (Pseudoplusia) includens (Lepidoptera: Noctuidae) (soybean looper)

Why	Identified in the EPPO tomato study. This species is highly polyphagous but is mostly a pest of soybean and tomato (CABI CPC).
Where	<p>EPPO region: absent</p> <p>North America: Bermuda, Canada (Nova Scotia, Ontario, Quebec, few occurrences), USA (Florida, Texas; throughout the rest of the USA – few occurrences) (CABI CPC)</p> <p>Central America: Costa Rica, Honduras, Nicaragua (CABI CPC)</p> <p>Caribbean: Cuba, Puerto Rico (CABI CPC) Martinique & Guadeloupe (uncommon), St-Kitts, Montserrat, Dominica, St-Lucia, St-Vincent, Jamaica, Hispaniola, Virgin Islands (Zagatti et al., 1995-2006)</p> <p>South America: Argentina (few occurrences), Bolivia, Brazil, Chile (few occurrences), Colombia, Ecuador, Guyana, Peru (CABI CPC), Venezuela (Eichlin and Cunningham, 1978)</p> <p>Oceania: Australia-Doubtful? (This is indicated in CABI CPC, referring to Eichlin and Cunningham (1978). However, the latter does not mention the presence of <i>C. includens</i> in Australia ("Quebec to West Indies; Florida to California; south to South America"). Herbison-Evans and Crossley (2013), which list moths of Australia, incl. several <i>Chrysodeixis</i> species, do not mention <i>C. includens</i>. No record was found for Australia in a general Internet search.)</p>
Climatic similarity	High. 13 common climates considering the countries listed above, but likely to be lower. In North America, <i>C. includens</i> migrates northwards from areas where it overwinters (tropics and subtropics, between the equator and the tropic of cancer). In the USA, overwintering populations occur only in south Florida and south Texas (CABI CPC). In areas of North America that have most similarity with the EPPO region, it is a migrant only, and does not overwinter. Southern Texas and southern Florida, where it overwinters, have climates that correspond to certain areas of the Mediterranean Basin.
On which plants	<i>C. includens</i> is highly polyphagous (28 families), but is generally only considered to be a pest of soybean and tomato (CABI CPC, 2013). From Eichlin and Cunningham (1978, citing others): <i>Medicago sativa</i> , <i>Nicotiana tabacum</i> , <i>Phaseolus</i> sp., <i>Glycine max</i> , <i>Gossypium hirsutum</i> , <i>Solanum esculentum</i> , <i>Commelina</i> sp., <i>Crotón capitatus</i> , <i>Lactuca sativa</i> , <i>Solidago</i> sp., <i>Brassica oleracea</i> , <i>Eupatorium</i> sp., <i>Geranium</i> sp., <i>Hibiscus esculentus</i> , <i>Pelargonium</i> sp., <i>Zebrina péndula</i> , <i>Chrysanthemum</i> sp., <i>Coleus</i> sp., <i>Lantana</i> sp., <i>Persea americana</i> . Main hosts in CABI CPC are <i>Abelmoschus esculentus</i> (okra), Brassicaceae (cruciferous crops), <i>Cajanus cajan</i> (pigeon pea), Cucurbitaceae (cucurbits), <i>Daucus carota</i> (carrot), <i>Glycine max</i> (soybean), <i>Gossypium</i> (cotton), <i>Ipomoea batatas</i> (sweet potato), <i>Lactuca sativa</i> (lettuce), <i>Phaseolus</i> (beans), <i>Saccharum officinarum</i> (sugarcane), <i>Solanum lycopersicum</i> (tomato), <i>Solanum melongena</i> (aubergine), <i>Sorghum bicolor</i> (sorghum), <i>Zea mays</i> (maize). Many other hosts are also listed in CABI CPC, such as <i>Allium sativum</i> (garlic), <i>Asparagus officinalis</i> (asparagus), <i>Capsicum annuum</i> (sweet pepper), <i>Mentha</i> (mints), <i>Solanum tuberosum</i> (potato) and many ornamentals.
Damage	Eggs on leaves, larvae on leaves or fruit (feed on fruit on tomato), pupae on leaves. Although this species feeds on a wide range of host plants, it is generally only considered to be a pest of soybean and tomato. On soybean, it feeds on pods if plants have been completely defoliated; on tomato, it normally feeds on fruit, even when foliage is present (CABI CPC, 2013). <i>C. includens</i> is reported as a severe pest of tomatoes, soybean, other beans, sunflower and aubergine in Puerto Rico; damage to tomato fruit can exceed 90% and total defoliation is common in heavy infestations (CABI, 2013). It is considered as one of the most destructive pest of soybean in the USA as well as in Northern Argentina (Barrionuovo et al., 2012). <i>C. includens</i> (and <i>Rachiplusia nu</i>) are reported by Barrionuovo et al. (2012, citing others) to cause damage to several high value crops, including aromatic

and oleraceous plants, as well as many field and vegetable crops (incl. *Helianthus annuus*, *Glycine max*, *Medicago sativa*, *Gossypium hirsutum*, *Phaseolus vulgaris*, *Linum usitatissimum* and *Nicotiana tabacum*). Note: *C. includens* also feeds on kudzu (*Pueraria lobata*) (invasive plant) (CABI CPC, 2013).

Dissemination	Adults fly, and migrate from areas where it overwinters (tropics and subtropics, between the equator and the tropic of cancer). This is the case in North America, where overwintering populations are reported in South Florida and South Texas (CABI CPC).
Pathway	Fruit and vegetables, plants for planting, cut flowers, pods, capsules? of host plants from countries where <i>C. includens</i> occurs.
Possible risks	<i>C. includens</i> has many host plants that are major crops in the EPPO region. The climatic similarity according to the EPPO Study between the area where it occurs and the EPPO region is high. For the pest to establish in the EPPO region, it would need to enter in areas where it may overwinter, from which it could migrate to other areas in summer.
Categorization	Quarantine pest for Japan 2011, Korea Rep 2011 (as <i>Chrysodeixis</i> spp.), Mexico 2011 (from the IPP)
Sources	<p>Barrionuevo MJ, Murúa G, Goane L, Meagher R, Navarro F. 2012. Life Table Studies of <i>Rachiplusia nu</i> (Guenée) and <i>Chrysodeixis</i> (= <i>Pseudoplusia</i>) <i>Includens</i> (Walker) (Lepidoptera: Noctuidae) on Artificial Diet. Source: Florida Entomologist, 95(4):944-951</p> <p>Eichlin TD, Cunningham HB. 1978. The <i>Plusiinae</i> (Lepidoptera: Noctuidae) of America north of Mexico, emphasizing genitalic and larval morphology. Technical Bulletin No. 1567. USDA</p> <p>Herbison-Evans D, Crossley S. 2013. Caterpillars of Australian moths. <i>Plusiinae</i>. http://lepidoptera.butterflyhouse.com.au/plus/plusiinae.html http://lepidoptera.butterflyhouse.com.au/plus/plusiinae.html (Accessed January 2014)</p> <p>Quarantine lists for Japan 2011, Korea Rep 2011, Mexico 2011 (from the IPP)</p> <p>Zagatti P, Lalanne-Cassou B, le Duchat d'Aubigny J. 1995-2006. Catalogue of the lepidoptera of the French Antilles. INRA Database. http://www7.inra.fr/papillon/indexeng.htm (Accessed January 2014) (referred to as INRA, NDb in Step 2)</p>