

***Lygus hesperus* and other American *Lygus* species (Hemiptera: Miridae)**

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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***Lygus hesperus*, *L. lineolaris* and other American *Lygus* pest species (Hemiptera: Miridae) (common name)**

Why	<p>Identified in the EPPO tomato study. <i>Lygus</i> species are highly polyphagous and several species occur in the Americas. This record focuses on <i>L. hesperus</i> and <i>L. lineolaris</i>, which seem to be the most important <i>Lygus</i> pest species in North America. Few data on host range and distribution of other American <i>Lygus</i> species are also given (<i>L. borealis</i>, <i>L. eliseus</i>, <i>L. keltoni</i>, <i>L. shullii</i>).</p> <p><i>L. lineolaris</i> was added to the EPPO Alert in 1998 because it was a pest of ornamentals in south-eastern USA. It was deleted in 2008 as no particular international action had been requested by EPPO member countries during that period. Information from the original Alert List record is used here. A PRA was performed in 2000 (EPPO, 2002) and concluded that the risk was not unacceptable (limited damage and restricted economic impact). However, there is still evidence of damage in the literature, and this species was retained here.</p>
Where	<p><u><i>Lygus hesperus</i></u> EPPO region: absent North America: North America: USA (CABI CPC, UC IPM, 2011 etc.), Canada (Gillespie et al. 2003) Mexico (Carvalho and da Silva Afonso, 1977).</p> <p><u><i>Lygus lineolaris</i></u> EPPO region: Absent. Netherlands (absent, confirmed by survey) (PQR) North America: Canada, Mexico, USA (PQR, Carvalho and da Silva Afonso, 1977; Gillespie et al. 2003; King and Saunders, 1984). Widespread, prefers warm, humid to dry climates in the South, Southeast and Southwest (EPPO; 2008) Caribbean: Bermuda, Canada, Mexico, USA; Central America: El Salvador, Guatemala, Honduras (PQR) Central America: El Salvador, Guatemala, Honduras (PQR, Carvalho and da Silva Afonso, 1977, King and Saunders, 1984)</p> <p><u><i>Lygus borealis</i></u> - North America: USA, Canada (Schuh, 2002-2013) <u><i>Lygus elisus</i></u> - North America: Canada (Gillespie et al. 2003), Mexico (Carvalho and da Silva Afonso, 1977), USA (Mueller et al., 2003) <u><i>Lygus keltoni</i></u> - North America: USA, Canada, Mexico (Schuh, 2002-2013) <u><i>Lygus shullii</i></u> - North America: Canada (Gillespie et al. 2003), USA (Schuh, 2002-2013)</p>
Climatic similarity	High. 12-13 common climates considering the countries and areas listed above.
On which plants	<p><i>Lygus</i> species are highly polyphagous on fruits, vegetables, [also ornamentals for <i>L. lineolaris</i>,] field and forage crops, and weeds and cause damage in the field and under glasshouse (Mueller et al., 2003, Ellsworth and Mason, ND).</p> <p><u><i>Lygus hesperus</i></u> - Recorded on 110 hosts (Holtz, 2002). Hosts include: apple, pear, sugarbeet, tomato, cotton, strawberry bean, grapevine, pistachio, carrot, lucerne, safflower, weeds, pome and stone fruit, vegetable crops cucumber (Holtz, 2002, CABI CPC, Mueller et al., 2003, Agriculture and Agri-Food Canada, 2008, La Rue and Johnson, 1989).</p> <p><u><i>Lygus lineolaris</i></u> - More than 300 host plants (EPPO, 2002). Host include: fruit trees (apple, apricot, cherry, grape), beans, cotton, carrot, potato, cabbage, lettuce, small fruits, <i>Cucurbita maxima</i>, <i>Medicago</i>, <i>Persea</i>, <i>Amaranthus</i>, cucumber (Mueller et al., 2003; Schuh, 2002-2013, Wheeler, 2001, Agriculture and Agri-Food Canada, 2008) and glasshouse hosts include <i>Aster</i>, chrysanthemums, <i>Dahlia</i>, <i>Impatiens</i> and <i>Tagetes</i> (EPPO, 2008).</p> <p>For the four species below, a few specific hosts were found, but these species are possibly polyphagous as indicated in Ellsworth and Mason, ND.</p>

	<p><i>Lygus borealis</i> Specific hosts mentioned: <i>Medicago</i> (Schuh, 2002-2013), peppermint, Indian mustard (CABI CPC).</p> <p><i>Lygus elisus</i> - Specific hosts mentioned: cucumber, carrot, pome and stone fruit, cotton, tomato (Agriculture and Agri-Food Canada, 2008, CABI CPC, La Rue and Johnson, 1989).</p> <p><i>Lygus keltoni</i> - Specific hosts mentioned: Asteraceae, <i>Chenopodium album</i> (Schuh, 2002-2013).</p> <p><i>Lygus schulli</i> - Specific hosts mentioned: herbaceous spp., lupinus (Schuh, 2002-2013), strawberry, quinoa, peach (Wheeler, 2001) cucumber (Agriculture and Agri-Food Canada, 2008).</p>
Damage	<p>Eggs on plants, nymphs and adults feed on flowers, buds, also fruit, and are mobile. Nymphs and adults feed on young tissue and immature fruit, causing deformation, yellowing, distortion of terminal growth and reduced plant growth. Flowers from damaged buds sometimes fail to develop on one side or the whole bud aborts (EPPO, 2008 and others).</p> <p><i>L. lineolaris</i> and <i>L. hesperus</i> seem to be the most important <i>Lygus</i> pest species. Ellsworth and Mason (ND) note that they are the main <i>Lygus</i> pests in North America, but that <i>L. elisus</i>, <i>L. borealis</i>, <i>L. schulli</i> and <i>L. keltonia</i> are pests in some regions. In Canada, <i>L. lineolaris</i>, <i>L. schulli</i>, <i>L. hesperus</i>, <i>L. elisus</i> are considered as pests on cucumber in glasshouse (Agriculture and Agri-Food Canada, 2008). Gillespie et al. (2003), mention specifically tomato, cucumber and pepper, and indicate that <i>Lygus</i> bugs are important pests attacking glasshouse vegetable crops in Canada; they are associated with lucerne or weedy habitats, and invade glasshouses. In Ontario and British Colombia, <i>L. hesperus</i>, <i>L. lineolaris</i>, <i>L. schulli</i> and <i>L. elisus</i> were collected during surveys around glasshouses (Gillespie et al., 2003). In Ontario, the only important <i>Lygus</i> is <i>L. lineolaris</i>, which is common on greenhouse pepper, also present on greenhouse cucumbers, and rarely a problem on tomato (Ferguson et al., 2012).</p> <p>In California, <i>Lygus</i> species (cited as "<i>L. hesperus</i> and others") move to tomato when their primary hosts are dry or harvested (UC IPM, 2011). Wheeler (2001) lists damage and economic losses recorded for Miridae pests, and reports damage on (among others) lucerne seed crops by <i>L. hesperus</i>; blackberry, raspberry, grape, pepper by <i>L. lineolaris</i>; strawberry by <i>L. hesperus</i> and <i>L. lineolaris</i>; apple and pear by <i>L. hesperus</i>, <i>L. elisus</i> and <i>L. lineolaris</i>; on peach by <i>L. lineolaris</i>, <i>L. hesperus</i>, <i>L. elisus</i> and <i>L. schulli</i>. Feeding on fruit is more serious than on flower or leaves (Wheeler, 2001). EPPO (2002) considered that <i>Lygus lineolaris</i> causes damage to foliage and flowers, of similar importance to common European <i>L. rugulipennis</i> (not considered a major pest).</p>
Dissemination Pathway	<p>Adults fly. No indication of international spread was found.</p> <p>Plants for planting (cut flowers?) of host plants (EPPO, 2008), fruit? (especially if green parts attached?).</p>
Possible risks	<p>The <i>Lygus</i> species considered have many hosts in the EPPO region, both in the field and in glasshouse. The climatic similarity according to the EPPO Study between the area where it occurs and the EPPO region is high. One major parameter of the risk is damage and association with fruit. Only one source mentions <i>L. borealis</i> as a pest, and it is probably very minor. Other species seem to have some importance in some circumstances. EPPO (2002), focusing on the ornamental pathway, considered that the risk by <i>L. lineolaris</i> is not unacceptable, as there is limited damage to host plants and restricted economic impact. The risk was considered as similar to that posed by the common European <i>L. rugulipennis</i>, which is not considered a major pest. One issue to assess the risk for these <i>Lygus</i> species is whether this assessment also applies to fruit crops, and whether there is a pathway into the region.</p>
Categorization	<p><i>L. hesperus</i> : Quarantine pest for Japan 2011, Korea Rep 2011</p> <p><i>L. elisus</i>: Quarantine pest for Japan 2011, Korea Rep 2011</p> <p><i>L. lineolaris</i>: Israel 2009, Brazil 1995 (from PQR), EPPO Alert List, 1998-2008; Quarantine pest for Costa Rica 2012, Ecuador 2008, Japan 2011 (from the IPP).</p>
Sources	<p>Agriculture and Agri-Food Canada. 2008. Table of crops, pests and active ingredients http://www4.agr.gc.ca/resources/prod/doc/pmc/pdf/mup_snp08_ent_e.pdf (Accessed January 2014)</p> <p>CABI CPC. 2013.</p> <p>Carvalho JCM, da Silva Afonso CR. 1977. Mirídeos Neotropicals, Ccviii: Sobre Uma Colecao Enviada Para Estudo Pela Academia De Ciencias Da California (Hemiptera). Rev. Brasil. Biol., 37(1): 7-16. http://research.amnh.org/pbi/library/0233.pdf (Accessed January 2014)</p>

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