Two Invasive Alien Insect Species, Leptoglossus occidentals (Heteroptera: Coreidae) and Cydalima perspectalis (Lepidoptera: Crambidae), and their Distribution and Host Plants in Istanbul Province, Turkey

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TWO INVASIVE ALIEN INSECT SPECIES, LEPTOGLOSSUS OCCIDENTALIS (HETEROPTERA: COREIDAE) AND CYDALIMA PERSPECTALIS (LEPIDOPTERA: CRAMBIDAE), AND THEIR DISTRIBUTION AND HOST PLANTS IN ISTANBUL PROVINCE, TURKEY

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ABSTRACT

Leptoglossus occidentalis (Heidemann, 1910) and Cydalima perspectalis (Walker, 1859) are alien insect species which have invaded Turkey. Leptoglossus occidentalis was recorded for the first time in Istanbul (Turkey) in 2009 and Cydalima perspectalis was recorded there for the first time in 2011. We examined the distribution of these two invasive alien insect species, and their host plants, in Istanbul province of Turkey. Leptoglossus occidentalis was observed in Istanbul Province on Pinus nigra, Pinus pinea, Pinus radiata and Abies concolor. Cydalima perspectalis was recorded only on Buxus sempervirens and B. sempervirens cv 'aureavariegata' in Istanbul Province, and severe damage was inflicted on these cultivars.

Key Words: Leptoglossus occidentalis, Cydalima perspectalis, Buxus sempervirens, Buxus sempervirens cv 'aureavariegata', Pinus nigra, Pinus pinea, Pinus radiata, Abies concolor

RESUMEN

Leptoglossus occidentalis (Heidemann, 1910) y Cydalima perspectalis (Walker, 1859) son especies de insectos exóticos invasores en Turquía. Se registró Leptoglossus occidentalis por primera vez en Estambul, Turquía en el 2009 y se registró Cydalima perspectalis por primera vez en Estambul, Turquía en el 2011. Este estudio examinó la distribución de estas dos especies de insectos exóticos invasores y sus plantas hospederas en la Provincia de Estambul en la Turquía. Se observó Leptoglossus occidentalis en la provincia de Estambul sobre Pinus nigra, Pinus pinea, Pinus radiata y Abies concolor. Se registró Cydalima perspectalis sobre Buxus sempervirens y B. sempervirens cv 'aureavariegata', en la Provincia de Estambul, y causando daño grave a estos cultivares.

Globalization of trade and travel on an unprecedented scale, has inadvertently led to the increased transport and introduction of alien species, and the breaking down of natural barriers between countries and continents (Lowe et al. 2000). Invasive alien species are increasingly recognized as one of the major threats to biodiversity (Wittenberg et al. 2006).

The western conifer seed bug, Leptoglossus occidentalis (Heidemann, 1910) (Heteroptera: Coreidae), is an invasive alien species of North American origin (McPherson et al. 1990). In Europe, it was first collected in Italy in 1999 (Tescari 2001). From there, it quickly expanded its range to western and eastern Europe (Bernardinelli & Zandigiacomo 2001; Hradil 2008; Kment & Banar 2008; Lis et al. 2008; Rabitsch 2008; Simov, 2008; Werner 2011). Leptoglossus occidentalis was recorded for the first time in Sariyer, Turkey in 2009 (Arslangündogdu &Hizal 2010).

Leptoglossus occidentalis is specialised to conifers. It has been recorded from about 40 species of conifers, mostly from pines (Pinales: Pinaceae), e.g., Coulter pine (Pinus coulteri D. Don), Aleppo pine (P. halepensis Mill.), Jeffrey pine (P. jeffreyi Balf.), sugar pine (P. lambertiana Douglas), western white pine (P. monticola Douglas ex D. Don), mugo pine (P. mugo Turra), Austrian pine (P. nigra J. F. Arnold), Italian stone pine (P. pinea L.), Ponderosa pine (P. ponderosa P. Lawson & C. Lawson), Monterey pine (P. radiata D. Don), red pine (P. resinosa Alton), California foothill pine (P. sabiniana Douglas), eastern white pine (P. strobus L.), and Scots pine (P. sylvestris L.), but also on Douglas fir (Pseudotsuga menziesii) [Mirb.] Franco, big-cone Douglas fir (P. macrocarpa [Vasey] Mayr), eastern hemlock (Tsuga canadensis Carrière), mountain hemlock (T. mertensiana [Bong.] Carrière), incense cedar (Calocedrus [=Libocedrus] decurrens [Torr.] Flörrin [Pinales: Cupressaceae]), white fir (Abies concolor [Gord. & Glend.] [Pinales: Pinaceae]), California red fir (A. magnifica A. Murray), white spruce (Picea glauca [Moench] Voss; [Pinales: Pinaceae]) and Italian cypress (Cupressus sempervirens L. [Pinales: Cupressaceae]) (e.g.,...
Leptoglossus occidentalis feeds on young developing cones and may cause abortion of young conelets, fusion of seeds to cone scales as well as direct damage by depletion of the lipid and protein content of the seed up to its complete emptying (Bates et al. 2000a, b). Tiberi (2007) listed L. occidentalis among pests of Pinus pinea cultivated in Italy. Uyemoto et al. (1986) reported damage caused by L. occidentalis on cultivated pistachio.

Box tree moth Cydalima perspectalis (Walker, 1859) is a Neotropical species of pest of Box Buxus sempervirens L.) in Turkey (Yaltırık and Efe 2000). Cydalima perspectalis is a new harmful pest of cultivated and wild Box trees in Turkey, particularly abundant in the Sariyer district. Cydalima perspectalis was recorded for the first time in Sariyer, Turkey in 2011 (Hizal et al. 2012).


Here I report on the distribution and host plants of L. occidentalis and C. perspectalis in the Istanbul Province Turkey.

**Materials and Methods**

Leptoglossus occidentalis especially prefers coniferous trees and damages young developing cones. For this reason, coniferous tree species distribution areas were marked on forest management plan maps. The marked points included possible areas of damage. The species is much easier to find in the late summer and fall when it is seeking out overwintering locations. Possible areas of damage were visited 4 times each month between the dates Sep-Dec 2009, Aug-Dec 2010, and Aug-Dec 2011. Adults were captured by using an insect net on the needles, cones and insects in flight. Bird nest boxes, the loose bark of trees, and buildings near the possible areas of damage were investigated.

Cydalima perspectalis larvae damage boxwood leaves. Buxus species are widely used for decorative purposes in parks and gardens. European and Asian (Anatolian) sides of the parks and gardens were visited 2 days a week starting on 20 Jun 2011. Leaves were searches for C. perspectalis larvae.

All data concerning the presence of these pests were transferred to tables and maps, and specific mapped locations were sampled to ascertain the distribution of these 2 adventive species.

**Results**

Leptoglossus occidentalis was first recorded from the Istanbul Province on 14 Sep 2009 in the Fatih Forest at Sariyer-Istanbul. Sampling locations and host plants on which L. occidentalis was observed for all sampling dates are listed in Table 1; and these same locations are displayed on the map of sampling locations, Fig. 1. Consistent with earlier host plant records, L. occidentalis was observed in the Istanbul Province on Pinus nigra, Pinus pinea, Pinus radiata, and Abies concolor.

Cydalima perspectalis was recorded for the first time in the European side of Sariyer-Istanbul in 15-VI-2011, and the species was particularly abundant in the Sariyer district. Cydalima perspectalis was not detected in the Asian side of Istanbul until 30-VII-2011 (Hizal et al. 2012).

Host plants on which C. perspectalis specimens were recorded and their locations are listed in the Table 2, and shown in Fig. 2. Only Buxus sempervirens, common boxwood, and B. sempervirens cv ‘aureavariagata’, golden variegated boxwood, were noted as host plants in Istanbul Province. I observed severe damage to Buxus spp. in the parks and gardens of Istanbul Province, where these boxwoods are used extensively in topiary plantings.

**Discussion**

In 2009 L. occidentalis was observed only on the European side of Istanbul, but in 2010, it was recorded for the first time from the Asian (Anatolian) side. At a minimum, the water barrier to dispersal in Istanbul is 700 m wide between Kandilli point and Aşiyan. This may have slowed down, but clearly did not stop, the spread of this very strong flier. It may be that the presence of large plantation areas in Istanbul Province contributed to ease with which this species has spread in Turkey. Because L. occidentalis is known as a pest of cultivated pistachio (Uyemoto et al. 1986), it’s presence in Turkey potentially threatens cultivated Pistacia vera L. (Sapindales: Anacardiaceae) in Turkey.

There are 2 natural Buxus species (Balearic box - Buxus balearica Lam., and Common Box - B. sempervirens L.) in Turkey (Yaltırık and Efe 2000). Cydalima perspectalis is a new harmful...
<table>
<thead>
<tr>
<th>Host Plant</th>
<th>European Side</th>
<th>Asian (Anatolian) Side</th>
<th>European Side</th>
<th>Asian (Anatolian) Side</th>
<th>European Side</th>
<th>Asian (Anatolian) Side</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pinus nigra</em></td>
<td>Fatih Forest (1)</td>
<td>Anadolu Feneri (8)</td>
<td>Fatih Forest (1)</td>
<td>Anadolu Feneri (8)</td>
<td>Fatih Forest (1)</td>
<td>Anadolu Feneri (8)</td>
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<td>Rumeli Feneri Road (2)</td>
<td>Polonezkoy (9)</td>
<td>Rumeli Feneri Road (2)</td>
<td>Polonezkoy (9)</td>
<td>Rumeli Feneri Road (2)</td>
<td>Polonezkoy (9)</td>
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<td></td>
<td>Koç University Campus (3)</td>
<td>Kanlica (10)</td>
<td>Koç University Campus (3)</td>
<td>Kanlica (10)</td>
<td>Koç University Campus (3)</td>
<td>Kanlica (10)</td>
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<td>Istanbul University Forestry Faculty Campus (4)</td>
<td>Beykoz (11)</td>
<td>Istanbul University Forestry Faculty Campus (4)</td>
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<td>Istanbul University Forestry Faculty Campus (4)</td>
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<td>Alemdag (13)</td>
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<td>Alemdag (13)</td>
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<tr>
<td><em>Pinus pinea</em></td>
<td>Fatih Forest (1)</td>
<td>Alemdag (13)</td>
<td>Fatih Forest (1)</td>
<td>Beykoz (11)</td>
<td>Fatih Forest (1)</td>
<td>Alemdag (13)</td>
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<tr>
<td><em>Pinus radiata</em></td>
<td>Feneryolu (6)</td>
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<td>Feneryolu (6)</td>
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<td>Feneryolu (6)</td>
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<tr>
<td><em>Abies concolor</em></td>
<td>Ataturk Arboretum (5)</td>
<td>(Not detected)</td>
<td>Ataturk Arboretum (5)</td>
<td>(Not detected)</td>
<td>Ataturk Arboretum (5)</td>
<td>(Not detected)</td>
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</table>
Hizal: *Leptoglossus occidentalis* and *Cydalima perspectalis* Newly Arrived in Turkey

Fig. 1. *Leptoglossus occidentalis* (western conifer seed bug) distribution in Istanbul Province, Turkey. This invasive species was found on *Pinus nigra*, *Pinus pinea*, *Pinus radiata* and *Abies concolor*.

Fig. 2. *Cydalima perspectalis* (box tree moth) distribution in Istanbul Province, Turkey. This invasive species was found only on *Buxus sempervirens*, common boxwood, and *B. sempervirens* cv ‘aureavariegata’, golden variegated boxwood on which it inflicted severe damage.
species that poses a great threat to both natural Buxus species and also the ones used in parks and gardens.

Our understanding of the biology, distribution, host plants, chemical and biological control methods of Leptoglossus occidentalis and Cydalima perspectalis in Turkey is far from adequate. Additional studies are needed to assess the extent of the threat posed by these 2 invaders, and to develop appropriate preventive or response strategies.

References Cited


Hizal: Leptoglossus occidentalis and Cydalima perspectalis Newly Arrived in Turkey


Mally, R., and Nuss, M. 2010. Phylogeny and nomenclature of the box tree moth, Cydalima perspectalis (Walker, 1859) comb. n., which was recently introduced into Europe (Lepidoptera: Pyralidae: Crambidae: Spilomelinae). European J. Entomol. 107: 393-400.


