



Entomological News

INSECT SPOTLIGHT

Ligurian leafhopper (*Eupteryx decemnotata*)

Summary

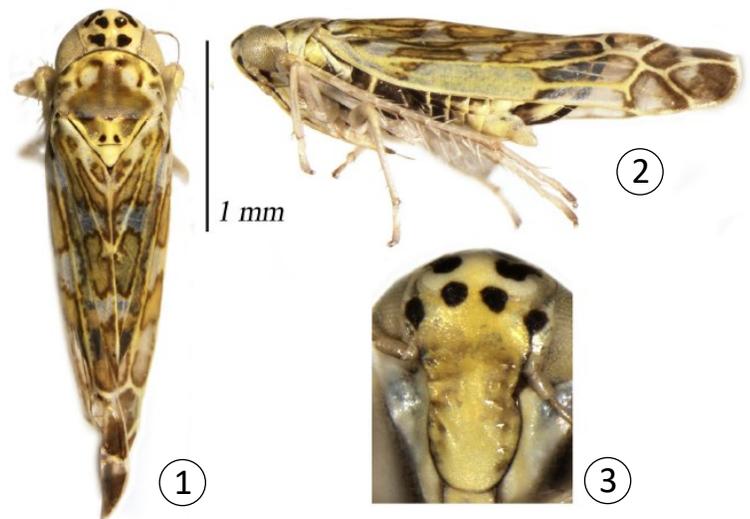
- Ligurian leafhopper (*Eupteryx decemnotata*) has been intercepted in Kansas for the first time.
- Ligurian leafhopper (LLH) is a European native that was first found in the US in 2008.
- LLH feeds on a diversity of herbs, damaging plants from feeding with their piercing-sucking mouthparts.
- LLH is not believed to pose a significant risk to Kansas.

Introduction

A leafhopper (Hemiptera: Cicadellidae) that is relatively new invasive to the US, Ligurian leafhopper (*Eupteryx decemnotata*) has been detected in Kansas for the first time in March 2020 (Figs. 1–3). Ligurian leafhopper (LLH) was discovered in a greenhouse operation feeding on rosemary (*Rosmarinus officinalis*) that was likely shipped from growers in Florida for retail (Fig. 4). Therefore, it is not believed to have established yet in Kansas.

LLH is native to Mediterranean coastal regions of France and Italy around the Ligurian Sea (hence the name). In the 1980s, LLH began expanding its range throughout Western Europe (Fig. 5). It is unclear what promoted this intracontinental expansion, but it is believed human-mediated transport of infested plant material and the increased planting of catnip (*Nepeta cataria*)—a preferred host—as an ornamental has facilitated spread (Nickel & Holzinger 2006).

LLH was first intercepted from infested rosemary at a retailer in Florida in 2008, consisting of a shipment originally from California (Rung et al. 2009). Subsequently,

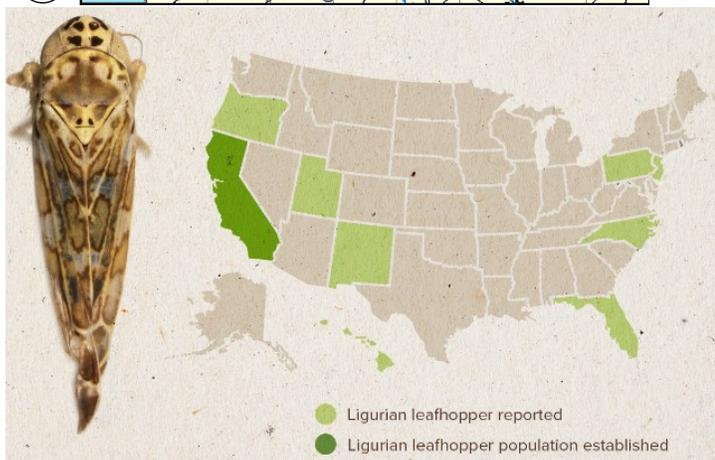
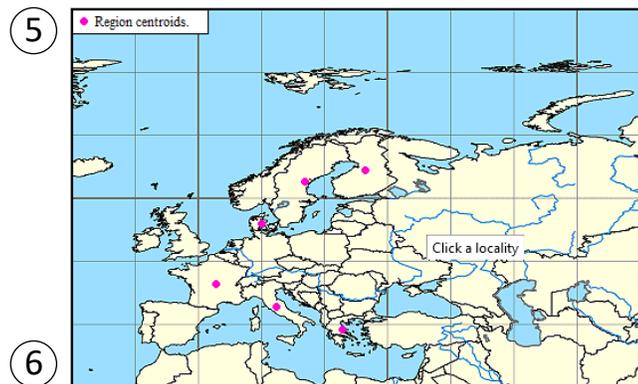


Figures 1–3. LLH adult female. (1) Body, dorsal; (2) Body, lateral; (3) Face. Source: Rung et al. (2009).



Figure 4. Damage to rosemary by LLH.

multiple states have had positive records but the extent to which they have established in various states is yet undetermined. However, it appears to be clearly established in California (Fig. 6).



Figures 5– 6. LLH distribution. (5) Europe; (6) United States. Source: Dmitriev (2003) & Oregon State University Plant Clinic Blog.

Identification

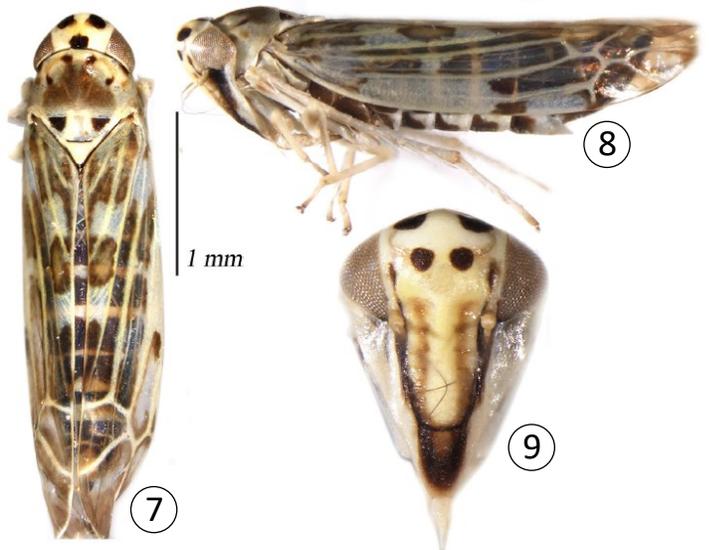
Approximately 12 species of *Eupteryx* are known from North America, of which six species or 50% of North American species are introduced from the Palearctic (BugGuide 2020, Dmitriev 2003, Poole & Gentili 1996) (Table 1). LLH are superficially similar to a related introduced sage leafhopper (*Eupteryx melissae*). Sage leafhopper is widely distributed in the US and is believed to be established in Kansas.

LLH adults are small, measuring <3mm with a distinctive mottled brown, yellow and white wing pattern, which is similar to sage leafhopper but differing from other North American *Eupteryx* species. LLH can be distinguished from sage leafhopper by the presence of ten black spots on the head compared to 5–7 on the sage leafhopper’s head (Figs. 1–3, 7–9). Sage leafhopper also feeds on an array of herbs and hosts loosely overlap with LLH, but the head spot pattern can be observed with a hand lens to

confidently distinguish the two related species (Rung et al. 2009).

#	Species	Distribution	Introduced	Host
1.	<i>atropunctata</i>	W. Europe	E. N.A.	Diverse herbs & potato
2.	<i>aurata</i>	Palearctic	E. N.A.?	Diverse herbs & potato
3.	<i>clavalis</i>	E. N.A.	—	Ferns
4.	<i>decemnotata</i>	W. Europe	E. & W. N.A.	Diverse herbs
5.	<i>filicum</i>	W. Europe	Vancouver, Washington	Ferns
6.	<i>flavoscuta</i>	E. N.A.	—	Ferns
7.	<i>furcata</i>	California, Oregon	—	?
8.	<i>melissae</i>	W. Europe	Widespread in N.A.	Diverse herbs, hollyhock, +
9.	<i>nigra</i>	E. N.A.	—	Ferns
10.	<i>omani</i>	Florida	—	Southern woodfern
11.	<i>vanduzei</i>	E. N.A.	—	Ferns
12.	<i>vittata</i>	Palearctic	E. Canada	Mint, ivy, nettle, plum, +

Table 1. *Eupteryx* known from North America.



Figures 7– 9. Sage planthopper adult female. (7) Body, dorsal; (8) Body, lateral; (9) Face. Source: Rung et al. (2009).

Biology

Eggs are deposited into leaf tissue and may be identified due to brown discoloration. At 20°C, eggs hatch in 21.46 ± 1.26 days. Females are capable of laying eggs for up to 3 weeks, laying 2–4 eggs/day. Due to the relatively long oviposition period, various developmental stages can overlap. LLH go through five nymphal stages with development taking 19.50 ± 1.83 days (fifth instar taking the longest at 5.53 ± 0.57 days, followed by the first at 3.93 ± 0.74

days). LLH typically overwinter as eggs, but adults and nymphs have been known to successfully overwinter as well (Mazzoni & Conti 2006). Assuming similar biology to another Eupteryx species introduced to North America, *E. atropunctata*, it is believed that LLH can potentially experience four generations beginning in late April to early May and continuing into December (Hoebeke & Wheeler 1983) (Fig. 10).

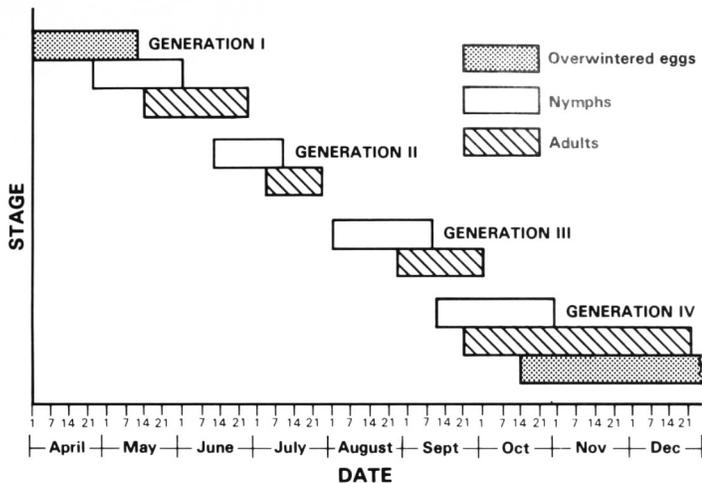


Figure 10. Seasonality of *E. atropunctata* based on data from Ithaca, NY. Source: Hoebeke & Wheeler 1983.

Feeding & Damage

LLH is known to feed on a diversity of herbs, particularly those in the Lamiaceae. In Central Europe the primary hosts are catnip (*Nepeta cataria*) and sage (*Salvia officinalis*), but at least an additional ten other hosts are known (Table 2). LLH, like other Typhlocybinae leafhoppers, feed on the mesophyll, emptying the contents of palisade and spongy parenchyma (Fig. 11). Individuals will insert their piercing-sucking mouthparts (stylet) into leaf surfaces and probe around feeding on intracellular contents (Fig. 12). After cellular content is removed the damaged

#	Common Name	Scientific Name
1.	Basil	<i>Ocimum basilicum</i>
2.	Catnip	<i>Nepeta cararia</i>
3.		<i>Nepeta</i> spp.
4.	Lemon balm	<i>Melissa officinalis</i>
5.	Marjoram	<i>Origanum majorana</i>
6.	Oregano	<i>Oreganum vulgare</i>
7.	Peppermint	<i>Mentha piperita</i>
8.	Rosemary	<i>Rosmarinus officinalis</i>
9.	Sage	<i>Salvia officinalis</i>
10.	Thyme	<i>Thymus vulgaris</i>
11.		<i>Thymus</i> spp.

Table 2. LLH hosts.

space becomes filled with air, resulting in a characteristic whitish mottled feeding damage known as typhlocybid stippling (Nickel & Holzinger 2006) (Fig. 4).

Occasionally LLH densities can become high enough to significantly damage and kill plants, with leaf stippling fusing and leading to partial leaf necrosis (Nickel & Holzinger 2006). For cultivated aromatic herbs, the major concern is adverse effect on essential oil content. The related sage leafhopper (*Eupteryx melissae*) feeding on Turkish and Greek oregano (*Origanum onites* & *O. vulgare hirtum* respectively) was observed causing 28.8–34.8% reduction in essential oil content and discoloration of leaves (Arslan et al. 2012). Despite potential damage, LLH is not known to transmit diseases like some other planthoppers.

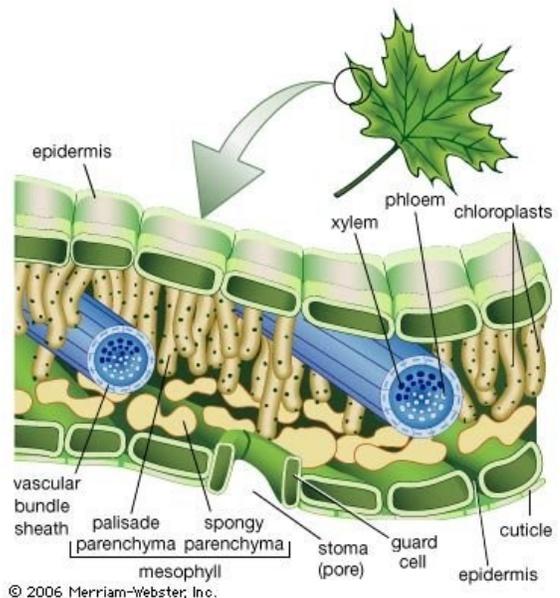


Figure 11. Leaf cellular structure, cross section. Source: Merriam-Webster, Inc.

Management

Presence and densities of LLH may be estimated by the presence of brown leaf spots caused from oviposition damage, by cast skins on plants, by agitating plants to stimulate individuals to hop/fly, using yellow sticky traps.

Information on management primarily comes from Europe where it has been present for longer. In Poland, herb producers have reported successfully using vacuums and yellow sticky traps to reduce LLH abundance. Multiple applications of neem seed derivative has been reported to provide effect control on rosemary grown in high tunnels in Switzerland (Tasi & Lucky 2020).

LLH is believed to constitute a member of a guild of planthoppers feeding on herbs and is not thought to pose a significant risk to herb gardens, nurseries and greenhouses.

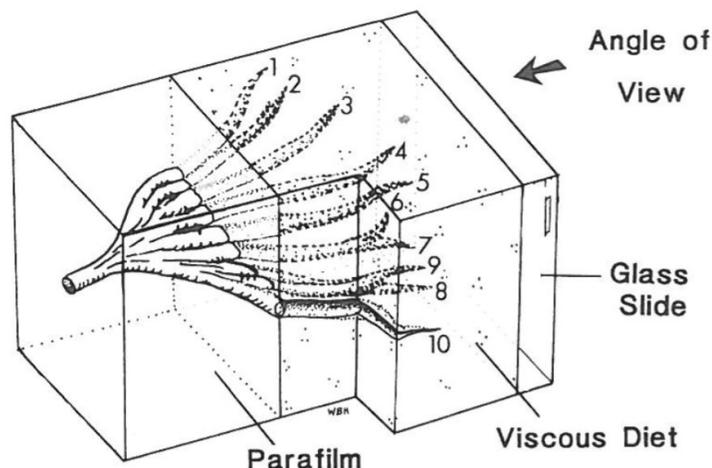


Figure 12. How leafhoppers probe the mesophyll. Source: Hunter & Backus (1989).

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