

An Annotated List of the Cicadellidae and Fulgoridae of Elm

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Abstract

This annotated list includes 87 cicadellid and 13 fulgorid entries that were found on and probably feed on elm to some extent. Thirteen of the cicadellid species listed are known vectors of virus or mycoplasma-like diseases of plants. Also, the following 18 cicadellid genera contain known vectors of virus or mycoplasma-like diseases of plants: *Aceratagallia* Kirk., *Agallia* Curtis, *Agalliopsis* Kirk., *Chlorotettix* VanD., *Coelidia* Germar, *Colladonus* Ball, *Draeculacephala* Ball, *Empoasca* Walsh, *Endria* Oman, *Graphocephala* VanD., *Gyponana* Ball, *Idiodonus* Ball, *Keonolla* Oman, *Macrosteles* Fieb., *Osbornellus* Ball, *Paraphlepsius* Bak., *Scaphoideus* Uhl., and *Scaphytopius* Ball. One fulgorid genus, *Delphacodes*, also contains vectors of virus or mycoplasma-like diseases.

EARLY IN THE STUDY of vectors of elm phloem necrosis, it was found that few cicadellids or fulgorids that feed on elm, *Ulmus americana* L., were listed in literature. Both families contain species that are known vectors of virus and mycoplasma-like diseases. *Scaphoideus luteolus* Van Duzee was reported the vector of elm phloem necrosis (Baker 1948, 1949, 1950). However there are many more species that are potentially vectors of this disease. Hoffman (1942) lists *Empoasca bipunctata* (Oshanin), *E. fabae* (Harr.), *Erythroneura basilaris* (Say), *E. kansana* Bak., *E. maculata* (Gill), *Typhocyba ulmi* (L.), and *T. rosae* (L.), of the Cicadellidae as feeding and/or breeding on elm. He lists *Acanalonia conica* (Say), *Ormenis pruinosa* (Say), and *O. septentrionalis* (Spin.), of the Fulgoridae on elm. The following alphabetical lists of Cicadellidae and Fulgoridae are compiled from collection data, unpublished rearing data, and literature. The reared insects were collected on elm, usually as nymphs, and reared on elm seedlings by personnel of the Bureau of Entomology and Plant Quarantine, Columbus, Ohio, from 1945 to 1953.

In the citations, the following code letters have been used: CAE—collected on American elm, RAE—reared on American elm, TA—collected on trees in association with elm, and HVA—collected on herbaceous vegetation in association with or near elm. Also the plus

(+) symbol has been used with the above codes to denote an abundance on one or more vegetation types.

Cicadellidae (Leafhoppers)

Aceratagallia sanguinolenta (Prov.). CAE, HVA+. Recorded from alfalfa, potatoes, grasses, willow, and weeds (Medler 1942). A known vector of New York strain of potato yellow dwarf (Black 1934, Nielson 1968).

Agallia constricta Van D. RAE, CAE+, TA+, HVA+. Listed hosts are clovers, soybeans, and other legumes (Osborn 1928). Recorded on alfalfa and alsike clover (Stearns 1927). This species is a known vector of clover big vein and potato yellow dwarf (Nielson 1968). Also listed as a vector of wound tumor virus (Black 1944, Black & Brakke 1952).

Agalliopsis novella (Say). CAE, TA, HVA. Recorded on alfalfa, clover, apple, and oak (Stearns 1927); also in poplar woods, tamarack swamp, and grass areas (Medler 1942). Vector of clover big vein and clover club vein. Also listed as vector of clover leaf-club virus (Black 1944, Maramorosch 1955, Beirne 1956), wound tumor, New Jersey and New York strains of potato yellow dwarf (Black 1941, 1944).

- Alebra albostriella* (Fall). CAE, TA, HVA. Young (1957) indicates this species probably is *aurea* (Walsh) which has been collected on maple, linden, oak, chestnut, sycamore, dogwood, and elm.
- Aulacizes irrorata* (F.). CAE, TA, HVA. Recorded on oak, sassafras, and weeds in open woods (Stearns 1927).
- Balclutha* spp. CAE, TA, HVA+. Blocker (1967) states grasses and sedges usually are host plants.
- Chlorotettix* spp. CAE, TA, HVA. Hosts include grasses, willow, strawberry, and salt marsh vegetation (Osborn 1915)). One species is a known vector of California aster yellows (Nielson 1968).
- Coelidia olitorius* (Say). CAE+, TA, HVA. DeLong reported sassafras as host in 1923 (Medler 1942). Host plants include apple, peach, catalpa, oak, and weeds in open woods (Stearns 1927). Note: *C. indica* Walker is a vector of sandal spike (Nielson 1968).
- Colladonus clittellarius* (Say). CAE, HVA, Beirne (1956) lists as vector of eastern X-disease of peach and cherry.
- Deltocephalus* spp. CAE, HVA. Some species recorded on lawns, wheat, oats, willow, and alsike clover.
- Dikraneura* spp. CAE, TA, HVA+.
- Draeculacephala* spp. CAE, TA, HVA+. Some species reported on alfalfa, clover, corn, timothy, and willow. Some species are vectors of Pierce's disease of grape and chlorotic streak of sugarcane (Nielson 1968).
- Empoasca* spp. CAE+, TA, HVA. Some species are vectors of bunchy top of papaya and little leaf of brinjal (Nielson 1968).
- E. bipunctata* (Oshanin). This European species taken only on elm in U. S. (Hoffman 1942). Host is Chinese elm (Beirne 1956).
- E. fabae* (Harr.). RAE. Economically destructive to apples, potatoes, legumes, vegetables, cotton, dahlia, and fruit trees. Reported a vector of potato yellow-dwarf.
- Endria inimica* (Say). RAE, CAE. Collected on herbaceous vegetation. Vector of striate mosaic of wheat and North American aster yellows, western strain (Nielson 1968).
- Erythroneura* spp. CAE+, TA, HVA.
- E. accola* McAtee. RAE, CAE.
- E. affinis* Fitch. RAE, CAE.
- E. alternata* Johnson. RAE, CAE. Johnson (1935) lists host as *Carpinus*.
- E. basalaris* (Say). RAE, CAE. Breeds on elm (Hoffman 1942). On plum and *Caragana* (Medler 1942).
- E. bigemina* McAtee. RAE, CAE. Johnson (1935) lists on *Ulmus*, *Aesculus*, and *Castanea*.
- E. campora* Robinson. RAE, CAE. Johnson (1935) lists as common everywhere especially on elm. Collected late May to October.
- E. comes* (Say). RAE, CAE. Hosts are *Vitis*, *Ampelopsis*, and *Cornus* (Medler 1942).
- E. contrasta*. RAE, CAE.
- E. fulvocephala* Robinson. RAE, CAE. Hosts are *Aesculus*, *Ulmus*, *Prunus*, *Vitis*, *Alnus*, *Robinia*, *Carpinus*, *Salix*, *Cercis*, and *Juglans* (Johnson 1935).
- E. harpax* Beamer. RAE, CAE. *Aesculus* is host (Johnson 1935).
- E. kansana* Baker. RAE, CAE. Taken only on elm (Hoffman 1942). Collected on *Rumex* (Medler 1942).
- E. lawsoni* Robinson. RAE, CAE. Common on sycamore in Ohio (Johnson 1935).
- E. maculata* (Gill.). RAE, CAE+. On sycamore and alfalfa (Stearns 1927)). On *Aesculus* (Johnson 1935). Host plant is sumac (Beirne 1956).
- E. noeva* (Gill.). CAE. Taken on *Carpinus*, *Quercus*, *Malus*, *Gleditsia*, *Aesculus*, *Juglans*, and *Acer pictum*. All stages found on last two hosts (Johnson 1935).
- E. obliqua* (Say). RAE, CAE. Taken on *Carpinus*, *Aesculus*, and *Ulmus* (Johnson 1935).

- E. osborni* (DeL.). RAE, CAE. On *Carpinus* (Johnson 1935).
- E. rubens* (Beamer). CAE.
- Eutettix* spp. Collected on American elm and nearby trees.
- Graminella fitchii* (Van D.). Rarely collected on American elm. Collected on herbaceous vegetation.
- Graphocelphala coccinea* (Forst.). RAE, CAE+, TA, HVA. Hosts are apple, peach, oak, alsike clover, timothy, and weeds (Stearns 1927). Common on shrubby vegetation (Osborn 1928).
- G. versuta* (Say). CAE, TA, HVA. Hosts include alsike, clover, ragweed and *Pinus virginiana* Mill. (Stearns 1927). Vector of phony peach disease (Turner 1949, Nielson 1968).
- Gypona* sp. RAE, CAE, TA, HVA.
- Gyponana octolineata* complex. CAE. Hosts include grasses, low herbage, bushes, and trees (Osborn 1915). One species of this genus is a vector of aster yellows and one is a vector of eastern X-disease of peach (Nielson 1968).
- Idiodonus kennecotti* (Uhl.). CAE, TA, HVA. One species of *Idiodonus* is a vector of aster yellows (Nielson 1968).
- Keonolla dolobrata* (Ball) = *Neokolla gothica* (Signoret). CAE, HVA. Vector of Pierce's disease of grape (Nielson 1968, Ishihara 1969).
- Kolla bifida* (Say). CAE, TA. On alfalfa, orchard grass, and oak (Stearns 1927). Many collected on herbaceous vegetation.
- Latalus sayi* (Fitch). Scarce on American elm. Collected on herbaceous vegetation. Abundant on bluegrass in Indiana (Brown 1939).
- Lonenus intricatus* (Uhler). RAE.
- Macrosteles divisa* (Uhler). CAE, HVA. Medler (1942) recorded this species as damaging oats and as a vector of aster yellows virus. Beirne (1956) says *M. fascifrons* (Stal.) is the correct name for the leafhopper which is a vector of aster yellows, lettuce yellows, white-heart, rabbit ear, and Rio Grande disease of lettuce, purple top and net necrosis of potato, flax crinkle, oat blue dwarf, and other yellows diseases. Six species of *Macrosteles* are known vectors of virus and viruslike diseases.
- Menosoma cincta* (O. & B.). Scarce on American elm and nearby trees.
- Neokolla seminuda* (Say). CAE, TA, HVA.
- Osbornellus auronitens* (Prov.). RAE, CAE. Beirne (1956) states ferns are probably hosts. Rarely collected on trees near elm and from grass and weeds. Note: *O. borealis* is the vector of a yellow leafroll strain of western X-disease of peach (Nielson 1968).
- O. clarus* Beamer. Collected on *Ulmus alata* Michx.
- Paraphlepsius irroratus* (Say). RAE, CAE, TA, HVA, Serious pest of grain crops and other plants (Brown 1939). On alfalfa, alsike clover, oak, apple, and peach (Stearns 1927). Population heavy on American elm in 1946. Vector of clover phyllody virus (Chiykowski 1965).
- Phlepsius* sp. CAE, TA, HVA+.
- P. leucoptthalmus*. RAE.
- Ponana* sp. CAE, TA, HVA.
- Scaphoideus* spp. CAE+.
- S. atlantus* Ball. RAE, CAE+, TA. Also collected on winged elm, ragweed, teasel, mustard, *Dipsacus* sp., & Early Marvel pea.
- S. auctus* DeL. & M. CAE.
- S. cinerosus* Osb. CAE.
- S. crassus* DeL. & M. RAE, CAE, TA. Also collected on grass and weeds.
- S. near dilatus* DeL. & M. CAE.
- S. diutius* DeL. & M. CAE.
- S. flexus* DeL. & M. CAE, TA.
- S. immistus* (Say). CAE+, TA. Osborn (1915) lists willow as host. Collected on apple, oak, Japanese maple, elm, and weeds (Stearns 1927). Host possibly *Salix* spp. (Beirne

- 1956). Commonly collected on winged elm and on grass and weeds.
- S. littoralis* Ball. CAE+, TA, HVA. This species, the vector of a yellows disease, "Flavescence doree" of grape in France, is also found in Italy on grape (Vidano 1964).
- S. luteolus* Van D. RAE, CAE+. Osborn (1928) reported this species was apparently rare. Collected on American elm by the thousands from 1940 through 1952. Rarely collected on poison ivy and Virginia creeper. Collected on winged elm. Reported as the vector of elm phloem necrosis disease (Baker, 1948, 1949, 1950).
- S. major* Osb. Host probably willow (Beirne 1956). One collected on American elm.
- S. melanotus* Osb. CAE.
- S. near merus* DeL. & B. CAE, TA.
- S. minor* Osb. CAE, TA, HVA.
- S. nigrellus* DeL. & M. RAE, CAE.
- S. nigricans* Osb. RAE, CAE+. Collected on grass and weeds and on *Washingtonia claytoni* Clarke (*Osmorhiza claytoni* [Michx] Clarke).
- S. obtusus* Osb. CAE.
- S. pullus* DeL. & M. CAE, TA, HVA.
- S. radix* DeL. & M. CAE, TA.
- S. scelestus* DeL. & M. RAE, CAE, TA, HVA. Collected on winged elm.
- S. sensibilis* Ball. RAE, CAE. Common on *Osmorhiza claytoni*.
- S. tergatus* DeL. CAE.
- S. torgus* DeL. & B. CAE, HVA.
- Scaphytopius* sp. CAE, TA, HVA.
- S. acutus* Say. CAE, TA, HVA. Vector of western X-disease of peach and cherry (Beirne 1956). Vector of alfalfa witches' broom, eastern X-disease of peach, little cherry, clover phyllody, and western aster yellows (Nielson 1968). Vector of eastern X-disease of peach and lucerne witches' broom (Ishihara 1969). Chiykowski (1962) studied the role of this species as a vector of clover phyllody in Canada.
- S. frontalis* (Van D.). CAE, TA, HVA. Ball listed blackberry as host (Medler 1942).
- Stirellus obtusus* (Van D.). CAE, TA, HVA.
- Typhlocyba* sp. RAE, CAE, TA, HVA.
- T. rosae* (L.) (=Edwardsiana). Nymphs and adults feed on apple, rose, and elm (Hoffman 1942). Hosts are apple, rose, plum, and *Rubus* sp. (Beirne 1956).
- T. ulmi* (L.) (=Ribautiana). Responsible for spotting of elm leaves (Hoffman 1942). Probably introduced from Europe, elm is host (Beirne 1956).
- Xestocephalus brunneus* Van D. CAE, TA, HVA. Common on willow and black locust in Indiana (Brown 1939).
- Xestocephalus pulicarius* Van D. CAE, TA, HVA. Osborn stated *Carex vulpinoides* is normal host (Medler 1942).

Fulgoridae (Planthoppers)

- Acanalonia bivittata* (Say). CAE, TA. Abundant on herbaceous vegetation.
- A. conica* (Say). RAE, CAE, TA, HVA.
- Amalopta* sp. CAE, HVA.
- Apache degeeri* (Kby). CAE, TA.
- Cedusa* sp. CAE, TA. Collected on herbaceous vegetation.
- Cixius* sp. CAE, TA. Collected on herbaceous vegetation.
- Delphacodes* sp. CAE, TA. Most collected on herbaceous vegetation. Species of this genus are vectors of rice stripe (Maramorosch 1963), oat striate-dwarf, wheat striate mosaic (Prusa, et al 1959), maize rough dwarf (Maramorosch 1963), oat dwarf tillering, and black-streaked rice dwarf (Shinkai 1962).
- Oliarus* sp. CAE, TA.
- O. vicarius* Walker. CAE, TA.

- Ormenis pruinosa* (Say). RAE, CAE+, TA, HVA. Lives on elm (Hoffman 1942).
- O. septentrionalis* (Spin.). CAE+, TA, HVA. Hoffman (1942) lists elm as host.
- O. venusta* Melich. CAE, TA. Collected on herbaceous vegetation.
- Thionia* sp. CAE, TA. Collected on herbaceous vegetation.

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