EPPO Datasheet: *Graphocephala atropunctata*

Last updated: 2024-07-30

IDENTITY

Preferred name: *Graphocephala atropunctata*
Authority: (Signoret)
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Hemiptera: Auchenorrhyncha: Cicadellidae
Other scientific names: *Hordnia circellata* (Baker), *Neokolla circellata* (Baker), *Tettigonia atropunctata* Signoret, *Tettigonia circellata* Baker
Common names: blue-green sharpshooter
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EU Categorization: A1 Quarantine pest (Annex II A)
EPPO Code: GRCPAT

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Notes on taxonomy and nomenclature

A substantial amount of older literature refers to this species as *Hordnia circellata*.

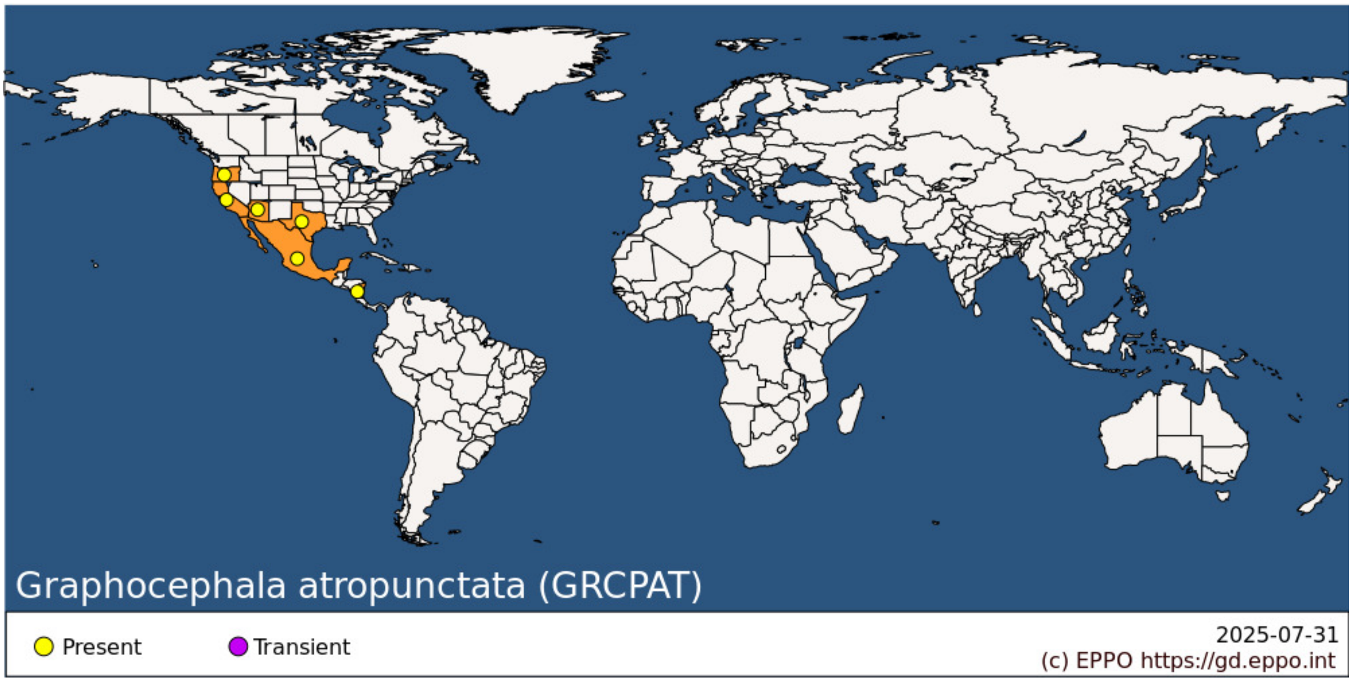
HOSTS

Graphocephala atropunctata feeds on a wide variety of host plants, and unlike other common economically important leafhoppers, is often found feeding on perennials plants including vines, trees and shrubs (Hewitt *et al*., 1949). It has been collected from over 150 plant species, and in areas where population densities are high it may be found on other plant species including ornamental plants and weeds. *G. atropunctata* tends to be less abundant on ferns and grasses (Hewitt *et al*., 1949). The list of hosts includes records from both natural and greenhouse/laboratory settings (Hewitt *et al.*, 1949; Freitag, 1951; Raju *et al.*, 1983; Hopkins & Adlerz, 1988; Hill & Purcell, 1995; Purcell & Saunders, 1999; Wistrom & Purcell, 2005; EFSA, 2013).

Host list: *Acacia longifolia*, *Acer macrophyllum*, *Aesculus californica*, *Amaranthus blitoides*, *Ambrosia acanthicarpa* , *Artemisia douglasiana*, *Artemisia vulgaris*, *Baccharis pilularis*, *Baccharis salicifolia*, *Cestrum elegans*, *Chenopodiastrum murale*, *Chenopodium album*, *Chenopodium quinoa*, *Cichorium intybus*, *Conium maculatum*, *Convolvulus arvensis*, *Coprosma baueri*, *Cyperus eragrostis*, *Cyperus esculentus*, *Dysphania ambrosioides*, *Erigeron canadensis*, *Eriochloa gracilis*, *Erodium moschatum*, *Eucalyptus camaldulensis*, *Eucalyptus globulus*, *Francoa sonchifolia*, *Fraxinus sp.*, *Fuchsia hybrids*, *Genista monspessulana*, *Hedera canariensis*, *Hedera helix*, *Helianthus annuus*, *Ipomoea purpurea*, *Juglans californica*, *Juglans regia*, *Lactuca serriola*, *Limonium perezii*, *Malva parviflora*, *Mentha arvensis*, *Myoporum laetum*, *Parthenocissus tricuspidata*, *Pelargonium capitatum*, *Pelargonium peltatum*, *Pelargonium x domesticum*, *Pelargonium x hortorum*, *Pittosporum eugenioides*, *Populus fremontii*, *Portulaca oleracea*, *Quercus lobata*, *Quercus sp.*, *Rosa californica*, *Rubus discolor*, *Rubus parviflorus*, *Rubus procerus*, *Rubus sp.*, *Rubus ursinus*, *Rubus vitifolius*, *Rumex crispus*, *Salix sp.*, *Salvia leucantha*, *Sambucus canadensis*, *Sambucus cerulea*, *Sambucus sp.*, *Scrophularia californica*, *Simmondsia chinensis*, *Sonchus oleraceus*, *Sorghum halepense*, *Symphoricarpos albus var. laevigatus*, *Symphoricarpos albus*, *Syzygium australe*, *Toxicodendron diversilobum*, *Umbellularia californica*, *Urtica dioica subsp. gracilis*, *Urtica dioica*, *Urtica sp.*, *Vicia faba*, *Vinca major*, *Vitis californica*, *Vitis rupestris*, *Vitis vinifera*, *Xanthium strumarium*

GEOGRAPHICAL DISTRIBUTION

Graphocephala atropunctata is found in the Western United States and as far south as Nicaragua. *G. atropunctata* prefers heavily vegetated areas along streams, rivers, and canyons (Delong & Severin, 1949). Although it requires damp conditions it does not thrive in overly wet or dark areas. This species can occur in very high densities within its preferred habitat.



North America: Mexico, United States of America (Arizona, California, Oregon, Texas)
Central America and Caribbean: Nicaragua

BIOLOGY

The female cuts a slit into the distal portions of a plant (or tendrils anywhere along the plant) and deposits a single egg which hatches between 16 and 22 days later (Severin, 1949a; Boyd & Hoddle, 2006). This contrasts with other common leafhopper grapevine pests which oviposit on the epidermal tissue on the undersides of leaves (Boyd & Hoddle, 2006). After hatching, the nymph will typically feed on the underside of leaves on the plant it emerged from. *G. atropunctata* typically has five instars (although some individuals can have 4 or 6 instars) and the total length of time spent in the nymphal stage (if feeding on grapevine) ranges from 47-51 days, with females taking longer to mature (Severin, 1949a). The time spent as a nymph can vary significantly on different host plants. In both Northern and Southern California, *G. atropunctata* has a single generation per year and adults overwinter before laying eggs in the spring (Severin, 1949a; Boyd and Hoddle, 2006). However, under some conditions a small second generation may be produced. In natural conditions, *G. atropunctata* can live from the summer of one year to the following spring. Under greenhouse conditions Severin (1949b) found that while there was a large range in longevity, the longest-lived males lived 129 days while the longest-lived female lived for 92 days. *G. atropunctata* can transmit *X. fastidiosa* which causes several diseases in a wide range of cultivated and wild host plants (EPPO, 2019).

Graphocephala atropunctata commonly feeds on perennial vegetation, and within its natural range several commonly used hedgerow species are among its preferred hosts.

DETECTION AND IDENTIFICATION

Symptoms

Graphocephala atropunctata infestation is primarily identified by observation of adults or nymphs. Unlike other economically important sharpshooters, oviposition does not appear to result in noticeable blisters or other defects in the plant (Boyd & Hoddle, 2007).

Morphology

*Eggs***-** little is known about the egg stage of *G. atropunctata*. Egg size and shape has not been described.

Larvae- Severin (1949) found that 1 day post hatching, nymphs ranged from 1.35 to 1.72 mm in length and between 4.72 and 5.39 mm one day after becoming a 5th instar. He also found that nymphal size was non overlapping, under the conditions the study was performed in, so instars could be identified by size. Nymphs are primarily white but have a yellowish tinge on the sides of the abdomen.

Pupae- no pupal stage

Adults- Under greenhouse conditions, adult male size ranged from 5.6 to 6.0 mm while females were 6.0 to 6.8 mm long (from head to end of the body) (Severin, 1949a). The head plus wing length was slightly longer than body length (Severin, 1949a). In general, the vertex is rounded and yellowish (or yellowish green) with a black spot at the tip and additional dark marks on the head. However, this species exhibits large variations in colour related to latitude. In its current range, southern populations are primarily blue with several highly contrasting markings on their pronotum and head whereas northern populations are dark green or blueish green with less contrasty markings (Severin, 1949a; Ballman *et al.*, 2011). Legs are yellow to bright orange (Baker 1898).

Detection and inspection methods

The oviposition location cannot be identified on a plant until either a nymph or parasitoid emerges (Boyd & Hoddle, 2007).

In the native range (North America) of *G. atropunctata*, double sided yellow sticky traps (with appropriate measures to prevent unintentional trapping of vertebrates) are placed in vineyards and surrounding vegetation, then checked weekly. Additionally, sweep netting or visual examination can be used to monitor for *G. atropunctata*.

Any plants for planting should be inspected for insects or imported from areas where *G. atropunctata* does not occur. There is no evidence that harvested fruits of any host are a threat, primarily because sharpshooters do not oviposit on fruits and adults are unlikely to remain associated with fruit during the harvest, processing, and transportation process (European Food Safety Authority, 2019).

PATHWAYS FOR MOVEMENT

Redak *et al.* (2004) identified *G. atropunctata* as having a high threat of becoming an invasive vector globally due to several characteristics. These include the fact it utilizes a wide range of host plants, including several commercially important ornamental species that are transported worldwide, and also because it occurs in diverse habitats and ecosystems. However, *G. atropunctata* appears to have limited dispersal capabilities as in its native range disease transmission is most likely to occur at the edges of agricultural areas close to its preferred natural habitat. It has been shown that both disease prevalence and *G. atropunctata* density declines with distance away from these natural areas (Daugherty *et al.*, 2012).

PEST SIGNIFICANCE

Economic impact

In its native range, *G. atropunctata* is considered to be one of the primary vectors of *Xylella fastidiosa*. It is an extremely efficient transmitter of *X. fastidiosa*, can occur in high densities, and has a wide geographic range. However, due to its preference for riparian habitats, disease outbreaks tend to be limited to plants adjacent to these areas (Purcell, 1975). Severin (1949b) found that *G. atropunctata* successfully transmitted *X. fastidiosa* from infected to healthy grapevine 65 % of the time and healthy alfalfa 35 % of the time. However, it was unable to transmit the bacterium from infected alfalfa to healthy alfalfa. *G. atropunctata* has a short (2 hours or lower) latent period that extends to 7 hours for transmission between grapevines (Severin, 1949b). Additionally, Severin (1949b) found that infected individuals can continue to transmit the bacterium for virtually their entire adult life however it is unknown if they can retain the bacterium under natural conditions (e.g. while overwintering).

Control

In California, insecticides are the most common control method, although spraying can be limited to the edge areas. Surrounding vegetation can be replaced with plant species not conducive to oviposition which can drastically reduce *G. atropunctata* abundance in agricultural areas. However, in many areas this would cause severe environmental damage as the riparian areas that *G. atropunctata* prefers, are already under anthropogenic threat. Research suggests these pests fly relatively close to the ground (less than 5 m above the ground) and therefore the creation of natural or artificial barriers could prevent sharpshooters from entering agricultural areas. However, a study by Daugherty *et al.* (2012) found that using barriers (in this study trees) at the borders of vineyards significantly reduced the numbers of *G. atropunctata* in a few years, though there was no significant decrease in numbers in most years. However, they suggest applying insecticides to barriers could improve efficacy and could be preferable to applying insecticides directly to grapevine or other crops.

Two mymarids (Hymenoptera): *Polynema* sp. near *eutettexi* and *Gonatocerus latipennis* have been identified as egg parasitoids of *G. atropunctata*. In particular, Boyd & Hoddle (2006) identify *Polynema* sp. near *eutettexi* as a potentially important natural control agent within its native range and further show this taxon will not parasitize eggs laid by the beet leafhopper, *Neoaliturus tenellus* which is the typical host of *P. eutettexi* (Boyd *et al.*, 2008).

Phytosanitary risk

G. atropunctata can transmit *X. fastidiosa* which causes several diseases in a wide range of cultivated and wild host plants (EPPO, 2019). *G. atropunctata* is listed primarily as a vector of Pierce's Disease (Redak *et al.*, 2004, EFSA PLH Panel, 2019). Greenhouse experiments have demonstrated it is a highly efficient vector, with a short latent period coupled with an extended period where insects can transmit the bacterium after exposure. Although Redak *et al.* (2004) considers *G. atropunctata* to be a likely candidate for establishing populations outside its native range, they determined that impacts would likely be limited to the local area. This is primarily due to observations within the native range where *G. atropunctata* tends to be limited to areas directly adjacent to riparian regions and similarly most disease transmission occurs on the edges, nearby the riparian zone. Due to its risk to Europe, *G. atropunctata* is listed as an EU A1 Quarantine pest (Annex II A) and is regulated as a quarantine pest in Moldova, Morocco and Tunisia, and as a A1 pest in Georgia, Switzerland, Türkiye and the United Kingdom (EPPO, 2024).

PHYTOSANITARY MEASURES

There are a range of phytosanitary measures that may be taken to reduce the risk of introduction and spread of *G. atropunctata*. These include pre-export inspections to ensure that consignments of host plants for planting are pest free. However, because it is currently not possible to identify oviposition sites, visual examination could miss viable eggs. Sourcing host plants for planting from pest free areas or in a pest-free place of production and phytosanitary certificates and plant passports are recommended measures.

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Datasheet history

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