Three true hopper species new for the Netherlands (Homoptera: Delphacidae & Cicadellidae)

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KEY WORDS
Auchenorrhyncha, Cicadomorpha, Climate change, Fulgoromorpha, *Toya*

Entomologische Berichten 82 (3): 90-93

In 2021, three species were identified as new for the Netherlands: the planthopper *Toya propinqua* and the leafhoppers *Cicadula placida* and *Edwardsiana alnicola*. The first two species clearly show, probably due to climate change, a range expansion from the south. The ecology and distribution of each species are discussed.

Introduction

Over the last 20 years, fieldwork has intensified, including the use of malaise and light traps. This has resulted in the addition of 51 true hopper species to the last fauna list of 2011 (Den Bieman *et al.* 2011) that are new for the Netherlands (Den Bieman *et al.* 2020, 2021a, 2021b, 2021c and references therein).

Three more species were identified in the Netherlands for the first time and presented in this article: *Toya propinqua* (Fieber, 1866), *Cicadula placida* (Horváth, 1897) and *Edwardsiana alnicola* (Edwards, 1924). Details on the distribution and ecology of these species are given.

The Dutch geographical coordinates (Amersfoortcoördinaten = AC) are given for each collection site. Unless stated otherwise, the material was collected by the authors and preserved in their collections. Identifications of all treated species are based on Biedermann & Niedringhaus (2004) and Ribaut (1952).

New species for the Dutch fauna

Delphacidae

Toya propinqua (figure 1)

Material Province of Zeeland: 3.5 km northwest of Kamperland, AC 35.1-401.1, 12.v.2021, 1 macropterous ♂.

This specimen was swept in a medium dry and sandy meadow next to a deciduous forest edge (figure 2), mown once a year and also frequented by pedestrians.

Toya is primarily a tropical genus represented by five species in Europe, mainly in the Mediterranean region. A critical evaluation of the European species is given in Della Giustina (2019). The discovery of the first *T. propinqua* in the Netherlands does not stand on its own: an increasing number of southern plant- and leafhopper species have reached the Netherlands in recent years. *Toya propinqua* occurs in most of the southern and central European countries: Albania, Austria, Bosnia Herzegovina,

1. Male of *Toya propinqua*, reared by H. Strübing. Photo: Gernot Kunz
1. Mannetje van *Toya propinqua*, uit een kweek van H. Strübing.

2. Collecting site of *Toya propinqua*. Photo: Kees den Bieman
2. Vindplaats van *Toya propinqua*.

Bulgaria, Croatia, Cyprus, Czech Republic, France, Germany, Greece, Hungary, Italy, Macedonia, Moldavia, Poland, Portugal, Romania, Slovakia, Slovenia, Southern European Russia, Spain, Switzerland, Ukraine and former Yugoslavia (Jach & Hoch 2013). Its occurrence north of the Alps is perhaps only irregularly (Nickel 2003). *Toya propinqua* is a pantropical species in the warmer regions of the Old World and the Nearctic (Jach & Hoch 2013, Wilson & Claridge 1991).

In Europe, *T. propinqua* is probably bivoltine with overwintering nymphs. Adults can be found from February till October (Della Giustina 2019, Nickel 2003). *Toya propinqua* is an eurytopic pioneer species, often collected on disturbed sites (Holzinger 2009, Nickel 2003).

It is an oligophagous species living on grasses, in particular *Cynodon dactylon*. It has also been observed on *Paspalum thunbergia*, *Digitaria*, *Zoysia japonica* and *Panicum repens* (Della Giustina 2019, Drosopoulos *et al*. 1983, Nickel 2003). This species is frequently collected in rice fields but there is little evidence of any significant damage to this crop (Wilson & Claridge 1991). However, dense populations can cause damage to young barley plants. Transmission of Cynodon chlorotic streak virus 16Sr is observed on maize and *Cynodon dactylon* (Della Giustina 2019, Lockhart *et al*. 1985).

In a study on samples from suction traps at 12 m height in France, *T. propinqua* was collected in numbers, all macropterous, in 30% of the traps from May till October (Della Giustina & Balasse 1999). Passive dispersion over longer distances by air currents seems likely for the flying individuals. In Iceland, a brachypterous male was collected on a locality close to a domestic airstrip (Remane 2005), indicating that it has probably arrived by plane or due to passive long-distance migration with jet-streams (Söderman *et al*. 2009). The first specimen of this species collected in the Netherlands is probably also a migrant. A collecting trip to the same locality at July 21, 2021 was in vain. A second delphacid species living on the grass *Cynodon dactylon* is *Laodelphax striatellus* (Fallén, 1826). This is also a vagrant species that has rarely been collected in the Netherlands before 2003. However, since 2003 *L. striatellus* is collected once or twice a year and it is sometimes able to establish a semi-permanent population (Den Bieman 2017, personal observations). Perhaps the same will happen to *T. propinqua*.

Cicadellidae-Cicadellinae

Cicadula placida (figure 3)

Material Province of Gelderland: Wageningen, AC 174.7-442.0, light trap, 9.vii.2021, 1♂.

The light trap was placed in a city garden. This light trap has been used regularly since 2018, but only four *Cicadula* specimen were collected since that time: one male of *C. flori* (Sahlberg, 1871), one male of *C. placida* and two unidentified females. Strong attraction of *C. placida* on dispersal flight by light is shown by samples collected in light traps in the suburbs of Brno (Czech Republic) (Malenovský & Lauterer 2005, Malenovský *et al*. 2011).

The genus *Cicadula* comprises fifteen species in Europe. Three belong to the subgenus *Henriana*, the Mediterranean species *C. lineatopunctata* (Matsumura, 1908) and two species that occur also in the Netherlands: *C. placida* and *C. frontalis* (Herrich-Schäffer, 1835). Differences between these species are given by Ribaut (1952). The antennae of *C. placida* are shorter than those of *C. frontalis* and the aedeagi differ in shape. The appendages of the aedeagus of *C. placida* are inserted closer to the base than in *C. frontalis* (see also Lock 2019). In Italy specimens collected in June were light yellow-green (var. *inornata* Ribaut, 1952) and specimens collected in November brown (Guglielmino *et al*. 2017). The single Dutch specimen is green.

Cicadula placida has primarily a south-eastern European distribution: Austria, Bulgaria, Czech Republic, France, Greece,

3. *Cicadula placida*, Geidorf, Graz, Austria, 19.vi.2009. Photo: Gernot Kunz
3. *Cicadula placida*, Geidorf, Graz, Oostenrijk, 19.vi.2009.

4. Female of *Edwardsiana cf. alnicola*, Göttingen, Niedersachen, Germany, 6.ix.2009. Photo: Gernot Kunz
4. Vrouwtje van *Edwardsiana cf. alnicola*, Göttingen, Nedersaksen, Duitsland, 6.ix.2009.

Hungary, Italy, Moldavia, Romania, Slovenia, South Eastern Russia and former Yugoslavia (Jach & Hoch 2013). Recently it was collected in the south-eastern part of Germany (Nickel 2011) and Belgium (Lock 2019). Since the identification of the first German sample in 2011, the species spread rapidly over the south of Germany (Achtziger *et al.* 2020). Outside Europe this species is known from a mountainous area in Iran (Mozaffarian & Wilson 2016).

The biology of *C. placida* has not been extensively studied. In Austria, adults were found from June till October, in Italy in June and July and again in October and November. The Italian data suggest that it is a bivoltine species, at least in the southern part of its distribution area. Eggs are the hibernating stage (Holzinger 2009, Guglielmino *et al.* 2017). *Cicadula placida* is collected on eutrophic shores of rivers and ponds, and open marshy sites in floodplain forests. These are all hygrophilous and thermophilous habitats. In Italy and France, it is collected, sometimes in high numbers, on *Phalaris arundinacea* and *Glyceria maxima* (and perhaps other Poacea species) (Guglielmino *et al.* 2017, Ribaut 1952). Holzinger (2009) indicates the same habitat type in Austria but mentions *Carex* as host plant. Malenovský *et al.* (2011) report *Carex acuta* as a host plant. The closely related *C. frontalis* lives on *Carex* species (Nickel 2003).

Cicadellidae-Typhlocybinae

Edwardsiana alnicola (figure 4)

Material Province of Noord-Brabant: Udenhout, De Brand, AC 137.4-404.8, malaise trap, 13-20.vi.2020 , 1♂, leg. IWG KNNV Tilburg; same location, malaise trap, 4-11.vii.2020, 1♂, leg. IWG KNNV Tilburg.

The taxonomically difficult genus *Edwardsiana* is species rich with at least 51 species in Europe (Jach & Hoch 2013) of which 23 species are listed for the Netherlands (Den Bieman & De Haas 2018, Den Bieman & Van Klink 2015, Den Bieman *et al.* 2011, 2020). *Edwardsiana alnicola* is characterized by the shape and the orientation of de aedeagus appendages (Biedermann & Niedringhaus 2004).

Edwardsiana alnicola is known from Austria, Czech Republic, Denmark, Estonia, Finland, Germany, Great Britain, Italy, Latvia, Norway, Poland, Romania, Slovenia, Sweden and Switzerland (Jach & Hoch 2013, Löcker 2003). The species has not been recorded in France, but it was also collected in Belgium recently (Lock in preparation). Throughout its geographical range, it is a rather rare or local species and therefore poorly known (Nickel 2003, Walczak *et al.* 2018). After the first records in 2020, extensive field research in 2021 was however unsuccessful in collecting *E. alnicola* in the nature reserve De Brand, the same location where the two Dutch specimens were found previously. This suggest that *E. alnicola* is also rare in this area.

De Brand is partly a very wet marshy deciduous forest, which corresponds to the habitat that is described for *E. alnicola* (Holzinger 2009, Nickel 2003). Specific habitat requirements are not known but the extreme localisation and rarity of the species indicate that such factors exist (Kirby 1992). It lives on *Alnus glutinosa* and *A. incana*, both very common species in the Netherlands (http://verspreidingsatlas.nl) and in De Brand. Adults are found from June till August, *E. alnicola* is a bivoltine species, and it hibernates in the egg stage (Holzinger 2009, Nickel 2003).

Acknowledgements

We are highly indebted to Gernot Kunz for the beautiful photos. We want to thank André van Eck for providing the Auchenorrhyncha specimens from a malaise trap in nature reserve De Brand.

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Accepted: March 29, 2022

Samenvatting

Drie nieuwe cicaden voor de Nederlandse fauna (Homoptera: Delphacidae & Cicadellidae)

Sinds 2011 zijn 51 cicadensoorten toegevoegd aan de Nederlandse faunalijst. Recent zijn weer drie soorten nieuw voor Nederland gevonden: *Toya propinqua*, *Cicadula placida* en *Edwardsiana alnicola*. *Toya propinqua* is een pantropische en mediterrane soort die steeds vaker in noordelijke landen gesignaleerd wordt. *Cicadula placida* breidt recent haar areaal vanuit Zuidoost-Europa uit. Beide zijn voorbeelden van zuidelijke soorten die hun areaal door het opwarmende klimaat noordwaarts uitbreiden. *Edwardsiana alnicola* is een soort die op els leeft en in haar hele areaal zeldzaam of zeer lokaal is. Specifieke habitateisen van deze soort zijn nog niet bekend. Van alle soorten wordt de verspreiding en de biologie beschreven.

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