

The genus *Recilia* Edwards, 1922 (Hemiptera, Cicadellidae) confirmed from Northern Europe

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There have been some uncertainties concerning the presence of *Recilia coronifer* (Marshall, 1866) in Northern Europe. The species was reported from Denmark in 1992, but the whereabouts of the specimens have been uncertain. In addition to these specimens, one additional record from Denmark and one additional record from Norway are presented. These records confirm the presence of the genus in Northern Europe and represent a hopper species new to the Norwegian fauna as well. The ecology and biology of the species are commented on.

Key words: Hemiptera, Auchenorrhyncha, Cicadellidae, *Recilia coronifer*, Northern Europe, Denmark, Norway, new record.

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Introduction

According to Söderman *et al.* (2009), 291 hopper species (Auchenorrhyncha) have been recorded from Norway. Adding some recent publications and some unpublished records, the actual number is exceeding 300 (Ødegaard *et al.* 2010), and increasing.

The genus *Recilia* Edwards, 1922 belongs to the tribe Deltocephalini within the subfamily Deltocephalinae of the Cicadellidae. The tribe Deltocephalini includes some of the most abundant grassland leafhoppers worldwide (Webb & Viraktamath 2009). There have been many different definitions of the genera within this tribe throughout history, especially regarding *Recilia* (see details in Webb & Viraktamath 2009).

According to Fauna Europaea (Jach 2013), three species of *Recilia* can be found in Central Europe, namely *R. coronifer* (Marshall, 1866), *R. horvathi* (Then, 1896) and *R. schmidtgeni* (W. Wagner, 1939). However, in their monograph on the Old World Deltocephalini leafhoppers, Webb

& Viraktamath (2009) revised *Recilia*, and except from two species, *R. coronifer* (Marshall, 1866) and *R. raoi* (Dash & Viraktamath, 1998), comb. nov. (from *Deltocephalus* Burmeister, 1838), they transferred all other species formerly in *Recilia* or *Deltocephalus* (*Recilia*) to the genus *Maiestas* Distant, 1917. Applying this, *R. coronifer* is now the only European species in its genus.

Material and methods

The current paper is based on a material of hoppers collected in an ongoing research program run by the Norwegian Institute for Nature Research (NINA). One of the objectives of the program is to investigate how species assemblages and their species traits in restricted and critical habitats are affected by the habitat's distribution in space and size, with specific focus on red-listed species (vascular plants and hoppers). One of the critical habitats investigated is the calcareous meadows in the Oslofjord area.

The habitat calcareous meadows is found mainly in sites with bedrock of Cambro-Silurian origin, in a zone between the sea/lake and forested inland areas, spanning from the area around the lake Mjøsa in the north to Grenland (Telemark county) in the south. The habitat is frequently exposed to drought, due to a combination of high soil drainage and exposure to wind and sun, and has a high occurrence of red-listed species, including vascular plants, lichens, fungi and insects. The habitat is an important hot spot habitat for both vascular plants and insects (Wollan *et al.* 2011).

In August 2012 and June 2013, 12 stratified patches of calcareous meadow within Oslo and Akershus counties were sampled (repeated) using a G-vac suction sampler. Three samples were taken from each patch, all consisting of three 0.25m² squares, giving a total of 2.25m² (0.75m² × 3) sampling effort on each patch each year, and a total of 54m² during the project so far. All specimens of Auchenorrhyncha were extracted from the sample using an exhaustor directly after sampling, and then the samples were transferred to a freezer and later dry pinned.

The species

Recilia coronifer (Marshall, 1866)

DENMARK East Jutland, Ebeltoft: Strandkær, 31 August 1991, D-vac, 3ex., leg. Jens Reddersen, det. Lars Trolle, coll. Natural History Museum of Denmark, Copenhagen; West Jutland, Billund: Grindsted, 1 August 1990, 1ex., leg., det. Lars Trolle, coll. Natural History Museum of Denmark, Copenhagen;

NORWAY AK, Bærum: Snarøya, Snarøykilen (SIS-patch 30_03) (32V5904536639119), EIS 28, 18 June 2013, G-vac, 1♂, leg., det. Anders Endrestøl, coll. NINA, Oslo

The patch (SIS-patch 30_03) is situated in a residential area on the south shore of the Snarøykilen on the Snarøya peninsula. The surroundings are a matrix of lawns, other types of meadows, single trees, a small forest and buildings. This patch is only 187m² and with 86 recorded species of vascular plants (Stabbetorp,

O. & Evju, M. unpubl. data).

R. coronifer has not been recorded from Northern Europe according to the latest checklist of Auchenorrhyncha from Northern Europe (excl. the British Isles) compiled by Söderman *et al.* (2009). It has a southern European distribution from western Britain to Spain in the west and east to Poland, Romania and Bulgaria. The species is 1st degree oligophagous on Poaceae (Maczey 2004). According to Nickel (2003), host plants are *Holcus mollis* and, less frequently, *Molinia caerulea*. Trivellone (2010) found *R. coronifer* in marshland habitats such as pseudo-redbeds and *Carex* spp. in Switzerland. It prefers medium to tall vegetation (Maczey 2004), but it is also recorded on short vegetation (Morris & Plant 1983, Morris 1990). It is usually found in low individual numbers (Morris 1990, Nickel 2003). From Germany, this species is characterized as being hygrophilous by Hildebrandt (1995) and according to Nickel (2003) found “*in moderately shady, occasionally also sunny, wet to damp, usually acidic sites [...]*”.

Recilia coronifer can easily be identified based on color pattern and shape of the head, style and aedeagus (Figures 1–2). Habitus is somewhat similar to *Psammotettix* Haupt, 1929,



FIGURE 1. *Recilia coronifer* (Marshall, 1866) is characterized by a broad black band on the transition between the vertex and face, which encloses seven white spots. Photo: Anders Endrestøl.

but is characterized by a broad black band on the transition between the vertex and face, which encloses seven white spots. It has styli with well-expressed subapical angles. The aedeagal shaft is short and robust, and weak to strongly up-turned distally with a distinct apical extension and distinct apical gonopore.

Discussion

Recent publications, including this, support the fact that several species of Auchenorrhyncha could still be found new to the Norwegian fauna (Endrestøl 2008, Endrestøl & Elven 2009) and some even new to Fennoscandia or Northern Europe as well (Endrestøl 2011, Ødegaard 2011). It also supports the fact that the Oslofjord area, with its calcareous meadows, is a species rich part of Norway.

According to Ossiannilsson (1983) and Söderman *et al.* (2009), *R. coronifer* is reported from neither Fennoscandia nor Northern Europe. Even so, Reddersen (1992) reports this species from Denmark and Endrestøl (2013) includes the species in the Danish checklist. According to Reddersen (1992), three specimens of *R.*

coronifer was collected with a D-vac suction sampler on ungrazed grassland on nutrient poor, acidic and sandy soils close to the Mols Laboratory, Djursland, Denmark in 1991–1992. However, there have been some uncertainties about this record. According to Reddersen (pers. com.), Lars Trolle (Danish Hemipterolog 1940–2007, see Endrestøl 2013) probably identified the specimens, but Trolle never commented on this species in any of his later publications. It was also not clear whether Trolle, if being the identifier, kept the specimens or returned it to Reddersen who later lost them (Reddersen pers. com.). Enquiries to different institutes in Denmark revealed that neither the original material nor the specimens of *R. coronifer* could be found at the Natural History Museum of Aarhus or the Mols Laboratory (at least according to current knowledge). Trolle's private collection is now stored at the Natural History Museum of Denmark (Copenhagen). It is not incorporated in their main collection, but stored separately in more or less systematic order. Dr. Emeritus Niels P. Kristensen was so helpful to investigate this material, and actually found the three specimens of *R. coronifer* collected by J. Reddersen, in addition to a fourth specimen collected by Trolle himself already in 1990.

R. coronifer is not reported from Denmark afterwards either on internet (Danmarks Fugle og Natur 2014) or by others (e.g. Endrestøl 2013, who collected Auchenorrhyncha in Djurland in 2009). The records presented here therefore confirm the genus from Northern Europe and represents a hopper species new to the Norwegian fauna.

The Norwegian specimen was collected from a small patch of calcareous meadow, but the question is whether this species could be assigned to this habitat or if it was causal occurrence. None of the host plants mentioned by Nickel (2003) were found on the patch (Stabbetorp, O. & Evju, M. unpubl. data), and neither *Holcus* spp. nor *Molinia caerulea* can be associated with calcareous meadow in the Oslofjord area. That is in contrast to the chalk grasslands in the UK, where at least *Holcus lanatus* characterize some of the sub-communities of chalk grassland (Maczey 2004). According to Nickel (2003), *H.*



FIGURE 2. Aedeagus of *Recilia coronifer* (Marshall, 1866) in lateral view. The aedeagal shaft is short and robust, and weak to strongly up-turned distally with a distinct apical extension and distinct apical gonopore. Photo: Anders Endrestøl.

mollis is found on more acidic substrate and in open forests and on clearings. *H. mollis* is found scattered around the Oslofjord area, but are not at all common, and only three records of *H. mollis* exists from Bærum municipality (Artsdatabanken 2014). *Molinia caerulea* is somewhat more frequent than *H. mollis* in the area, but records are also scattered and with only about ten records in Bærum municipality after 1975 (Artsdatabanken 2014).

There is of course a possibility that one or both of these plants have populations near the actual patch that have not been registered, or that *R. coronifer* in Norway lives on another host plant within Poaceae. 13 species of Poaceae were found within the patch in question (*Agrostis capillaris*, *Avenula pratensis*, *Dactylis glomerata*, *Elytrigia repens* ssp. *repens*, *Festuca ovina* ssp. *ovina*, *F. rubra*, *Melica nutans*, *Phleum phleoides*, *Poa alpina* var. *alpina*, *P. compressa*, *P. nemoralis*, *P. pratensis* and *Triticum aestivum*).

Morris (1971) investigated the hopper fauna in chalk grasslands in the UK, and also found one single specimen of *R. coronifer* in his material. He regarded this finding as probably casual occurrence. Later, Maczey (2004) investigated the same habitat, chalk grasslands, concerning the Auchenorrhyncha fauna, but in a larger scale (South England). He concluded, in contrast to Morris (1971), that *R. coronifer* was so frequently found on unimproved chalk grassland in his study, suggesting that it form a substantial part of the Auchenorrhyncha fauna on British chalk grassland. He defined *R. coronifer* to be a “*preferential species of MG1 within the MG*” but also found frequently in CG. That means that the species had higher frequencies or was in dominance in the plant community MG1 (Mesotrophic Grassland 1: *Arrhenatherum elatius* grassland) in comparison with other mesotrophic grassland plant communities, but that the differences between CG (Chalk Grassland) and MG where not significant. Maczey (2004) therefore suspects that *R. coronifer* might have a different niche in the UK compared to the European continent due to being at the edge of the species geographical range and difference in climate.

Several facts also support the casual occurrence

hypothesis for the finding reported here; 1) only one single specimen was found on the actual patch and on all together 54m² of calcareous meadows investigated, 2) being characterized as having high dispersal ability (see Maczey 2004) also makes it more probable that *R. coronifer* would be found outside its preferable habitat, 3) the host plant genera are rare and uncommon on calcareous meadows in the Oslofjord area. Even so, it is likely that this species might be more xerophilic in Norway, not due to true changes in it ecological preferences, but due to being situated at the northern edge of the species range, as concluded from the findings in the UK (Morris & Plant 1983, Maczey 2004).

As only one specimen was found, one should not rule out the possibility of long distance wind dispersal from the continent (with jet streams). Della Giustina & Balasse (1999) found among other Deltocephalinae, four specimens of *Maiestas schmidtgeni* (*Recilia schmidtgeni*) in areal plankton collected with suction samples. Still they concluded that “[...] in France, if *Auchenorrhyncha* species migrate at all, it is mainly for short distances. Long distance dispersal is an exception” (della Giustina & Balasse 1999). From Mols, Denmark, to Bærum, Norway, *R. coronifer* would have to cover a distance of more than 400km, and both the distance and the probability of the specimen being collected from 0.75m² in Bærum is not very likely. Future investigations should reveal the exact status of the species distribution in Norway.

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