

New and interesting records of Miridae (Hemiptera, Heteroptera) from Norway

FRODE ØDEGAARD

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Miridae is the most species rich family of true bugs (Hemiptera, Heteroptera) both worldwide and in Norway. This paper reports a total of 24 species new to the Norwegian fauna, of which three are new to the Nordic countries. Short remarks are also given for records of some other particularly rare or interesting species. The number of Miridae observed in Norway is currently 208 species.

Key words: Hemiptera, Heteroptera, Miridae, faunistics, Norway, Fennoscandia, Palaearctic

Frøde Ødegaard, Norwegian University of Science and Technology (NTNU), Department of Natural History, NO-7491 Trondheim, Norway. E-mail: frøde.odegaard@ntnu.no

Introduction

The Miridae is by far the largest family of Heteroptera with more than 1400 genera and 10 000 described species worldwide, of which 397 genera and 2808 species has been found in the Palaearctic zone (Kerzhner & Josifov 1999). All Miridae in our region are plant-feeding sap suckers, however a lot of them use other soft bodied insects as additional food source. Many species are specialists to certain host plants at genus or species level (Wachmann *et al.* 2004).

The Miridae fauna of Norway is poorly mapped geographically with rather few faunistic reports. Hågvar (2006) summarized the accumulation of reported Heteroptera new to Norway over time from Siebke (1874) to 2006. A milestone in this progress was Warloe's catalogue (Warloe 1924), however after this publication several decades with very low publication activity followed. The Norwegian fauna of Heteroptera was last catalogized by Coulianos (1998) who reported 169 species of Miridae. In the following years, 14 new country records of Miridae were published

from Norway by Ødegaard (1998), Hågvar (1999), Ødegaard & Endrestøl (2007), Staverløkk *et al.* (2009), Hågvar 2010, Endrestøl & Ødegaard (2011), Olsen *et al.* (2017), Endrestøl & Berggren (2018) and Gustad (2020). Note also that *Psallus mollis* (Mulsant & Rey, 1852) was first published by Hansen & Coulianos (1998), but neither mentioned as new to the country nor included by Coulianos (1998) (Endrestøl & Ødegaard 2011).

The current paper deals with an additional 24 species of Miridae recorded in Norway, bringing the total number up to 208 species. This contribution also reports recent records of some other rarely collected species.

Material and methods

The material was mainly collected by sweep netting or beating on target plants. Reference material is deposited in the insect collections at NTNU University Museum in Trondheim (NTNU) unless otherwise is mentioned. Abbreviations for collectors of material are as follows: Kai Berggren

(KB), Jarl Birkeland (JB), Anders Endrestøl (AE), Gunnar Engan (GE), Kjell Magne Olsen (KMO), Per Kristian Solevåg (PKS), Arnstein Staverløkk (AS), and Frode Ødegaard (FØ). Other abbreviations: MT= Malaise trap; SN= sweep netted. The coordinates are given in decimal degrees (Grid: Latitude/Longitude hddd.dddd°; datum: WGS84). The faunistic divisions within Norway follow Økland (1981) and are given in bold. Species new to Norway are marked *. Some species collected before 2020, may be reported from Norway in obscure reports, newsletters, or association with red list assessments (Kålås *et al.* 2010, Henriksen & Hilmo 2015, Artsdatabanken 2021), however they have never been explicitly published as new to Norway.

Results

The material is presented species by species in systematic order after Kerzhner & Josifov (1999). Short remarks on distribution, ecology or taxonomic issues are presented for each species.

The records

Bryocorinae, Dicyphini

Macrolophus rubi Woodroffe, 1957

Material: AK, Oslo: Tøyen Botanical Garden [59.91867°N–10.77254°E], 1 September 2022, 12 September 2022, several adults, and nymphs on unidentified Lamiaceae plant, leg. FØ,

Remarks: There is a lot of confusion about taxonomy of European species of *Macrolophus* (e.g., Josifov 1992, Castane *et al.* 2013), but the recorded specimens are clearly different from typical *M. pygmaeus* (Rambur, 1839) by the relative length of the third antennal segment, which is at least twice that of the fourth, and the shape of the black spot behind the eye. In addition, *M. pygmaeus* is normally found in May–June, while these populations had adults and nymphs in late summer and autumn. *Macrolophus* spp. with foreign origin have been used in Norway as a biological control agent (may be several species) (VKM 2015), and it cannot be ruled out that

the specimens of *M. rubi* descend from escaped greenhouse populations. These are the first outdoor observations of an established population of this species in the Nordic countries.

* *Tupiocoris rhododendri* (Dolling, 1972)

Material: AK, Oslo: Vestre Aker gravlund [59.93578°N–10.72867°E], 1 August 2022, 1♀, beaten from *Rhododendron* sp., leg. FØ & AS; VAY, Kristiansand, Ravnedalen [58.15663°N–7.97303°E], 3 August 2022, 10 ex., beaten from *Rhododendron* sp., leg. FØ.

Remarks: The species is new to Norway. *T. rhododendri* originally comes from the USA and was first found in Europe in England in 1971. The species was found new to Denmark in 2009 (Skipper 2013), and Sweden in 2011 (Szpryngiel & Coulianos 2017). Most populations have probably been unintentionally introduced with *Rhododendron* plants.

Deraecorinae, Deraecorini

* *Deraeocoris flavilinea* (A. Costa, 1862)

Material: AK, Oslo: Lysaker [59.92183°N–10.63110°E], 18 July 2021, 1♂, beaten from *Acer platanoides*, leg. FØ; SE Linderud gård [59.94160°N–10.83566°E], 27 July 2021, 2 ex., leg. og coll. KMO; Bygdøy, Dronningberget [59.91400°N–10.68284°E], 18 June 2023, 1♂, beaten from *Acer platanoides*, leg. FØ; Bygdøy, Wedels vei [59.91369°N–10.68886°E], 18 June 2023, 1♂1♀, beaten from *Acer platanoides*, leg. FØ; STI, Trondheim: Leangenbukta, [63.44102°N–10.47075°E], 17 July 2022, 1♂, beaten from *Tilia x europaea*, leg. FØ.

Remarks: The species is new to Norway. *D. flavilinea* was described from Sicilia and was for a long time considered endemic for the island. In recent years it has shown a remarkably rapid range expansion and is currently distributed in most countries of northern Europe (Skipper 2013).

Mirinae, Mirini

* *Agnocoris reclairei* (Wagner, 1949)

Material: AK, Oslo: Tøyen Botanical Garden [59.91792°N–10.77265°E], 1 September 2022,

1♂, beaten from unidentified *Salix* sp., leg. FØ.

Remarks: The species is new to Scandinavia. *A. reclairei* may be confused with the common *A. rubicundus* (Fallén, 1807), but may be identified in e.g., Wagner (1952). Most likely the Norwegian record descends from unintentionally introduced individuals as the specimen was recorded in a botanical garden and the distance to the nearest known population is very far.

*** *Capsus wagneri* Remane, 1950**

Material: Ø, Marker: Gjølsjø [59.44228°N–11.68756°E], 8 July 2017, several specimens on *Calamagrostis* sp., leg. FØ; Aremark: Kutjernmosen [59.33608°N–11.69412°E], 23 July 2017, several specimens on *Calamagrostis* sp., leg. FØ.

Remarks: The species is new to Norway, however also mentioned in a newsletter from the year of discovery (forskning.no 2017). *C. wagneri* can easily be confused with *C. ater* (Linnaeus, 1758), however, since the species is very numerous on *Calamagrostis*, the Norwegian occurrences most likely represent range expansion from the south and east.

*** *Dichroscytus gustavi* Josifov, 1981**

Material: RY, Sandnes: Hove [58.83359°N–5.73301°E], 17 June 2016, 1♂, beaten from *Thuja* sp., leg. FØ; TEY, Kragerø: Kragerø kirke [58.87111°N–9.41386°E], 20 June 2023, several specimens beaten from *Chamaecyparis lawsoniana*, leg. FØ.

Remarks: The species is new to Norway. *D. gustavi* has probably been unintentionally introduced to Norway with garden plants. The species was found new to Denmark in 2010 (Skipper 2013), and Sweden in 2001 (Szpryngiel & Coulianos 2017).

***Megacoelum infusum* (Herrich-Schaeffer, 1837)**

Material: BØ, Hole: Holmedal [59.98880°N–10.30145°E], 1 July 2023, 12 ex., beaten from *Tilia cordata*, leg. & coll. PKS; Østbråtakollen [59.99327°N–10.29477°E], 17 July 2023, 15 ex. beaten from *Tilia cordata*, leg. FØ; TEI, Seljord: Heggeneset W [59.44023°N–8.77886°E], MT 17 July – 4 September 2015, leg. & coll. KMO.

Remarks: This species is previously only known from AK, Oslo, Bygdøy and Hovedøya (Henriksen & Hilmo 2015). The two Hole-localities represent parts of a long southwestern faced rocky slope, which become extremely warm due to the exposition. According to the literature (Gaun 1974, Skipper 2013) the activity period of *M. infusum* as adults should be in August and September. At this site the species may emerge as adults already in late June. Elsewhere in Scandinavia, the species seems to prefer oak (*Quercus*) (Gaun 1974, Skipper 2013), however the present records of large populations on *Tilia cordata* from the Hole-localities may reflect other preferences in Norway.

***Phytocoris reuteri* Saunders, 1876**

Material: VAY, Søgne: Årossanden [58.07466°N–7.81641°E], 19 July 2023, 1♂, beaten from *Cytisus scoparius*, leg. FØ.

Remarks: This species was reported new to Norway from AK by Hågvar (1999). The present record is the second from Norway.

***Pinalitus atomarius* (Meyer-Dür, 1843)**

Material: AK, Oslo: Vestre Aker gravlund [59.93579°N–10.72867°E], 24 August 2022, 3♂♂1♀; 31 August 2♂♂, beaten from *Abies* sp., leg. FØ; AAY, Risør: Lille Søndeled, [58.76807°N–9.08738°E], 13 September 2022, several specimens beaten from *Abies* sp., leg. FØ.

Remarks: This species was reported new to Norway from AK, Oslo: Bygdøy by Endrestøl & Berggren (2018). The new records indicate that the species is well established in southeastern Norway.

*** *Pinalitus viscicola* (Puton, 1888) (Figure 1)**

Material: VE, Horten: Karljohansvern [59.42937°N–10.49107°E], 16 July 2023, several specimens beaten from *Viscum album*, leg. FØ. The species was found together with large amounts of the psyllid *Cacopsylla visci* (Curtis, 1835).

Remarks: This species is new to Norway. The mistletoe bug *P. viscicola* is mainly distributed in Central Europe including UK and was recorded new to the Nordic countries in Sweden in 2008



FIGURE 1. *Pinalitus viscicola* (Puton, 1888) from VE, Horten: Karljohansvern. Photo: A. Staverløkk.

(Struwe *et al.* 2009). Struwe *et al.* (2009) argue that Scandinavia populations of mistletoe-associated insects may be relicts from earlier times when the plant was more evenly distributed. However, a recent introduction cannot be excluded, as urban habitats are prone to unintended introductions of insects.

* *Polymerus palustris* (Reuter, 1905)

Material: AK, Vestby: Sonkilen [59.52930°N–10.68135°E], 29 July 2011, 1 ex., leg. & coll. GE; Sonkilen [59.52952°N–10.68154°E], 13 July 2014, 2♂♂1♀, leg FØ & GE; 18 July 2014, 3♀♀, on *Galium palustre*, leg FØ; Ø, Råde: Skinnerflo E, Finnstadbukta [59.31974°N–10.94275°E], 21 June 2022, 1♂, SN, leg. FØ & GE; HES, Åsnes: Flisa, Ferder [60.58805°N–12.02267°E], 13 July 2003, SN, leg. FØ; Åsnes, Hof E [60.54721°N–12.04293°E], 18 July 2021, 1♂1♀, on *Galium palustre*, leg FØ; TEY, Drangedal: Eplekjerr [58.99222°N–9.19033°E], 19 July 2021, 2♀♀, on *Galium palustre*, leg FØ; AAY, Arendal: Holtebekkmyra [58.53173°N–8.80063°E], 22 June 2016, 1♂1♀, SN, leg. FØ.

Remarks: The species has not been published explicitly as new to Norway, although included in Red List assessment from 2015 (Henriksen & Hilmo 2015). The first record dates to 2003 from HES. The species is found in moist areas with the host plant *Galium palustre* (Gaun 1974) and seems to have a wide geographical distribution in southeastern Norway.

* *Polymerus vulneratus* (Panzer, 1806)

Material: AK, Bærum: Fornebu [59.897°N–10.611°E], 16 July 1999, 1♂, SN, leg. FØ.

Remarks: The species has never been published explicitly as new to Norway, although included in Red List assessment from 2010 (Kålås *et al.* 2010). The specimen was found in the large dry meadows at the decommissioned airport Fornebu. This area has gone through substantial changes the last two decades and very few patches of the original nature type is left. Search for the species in recent years has failed.

Mirinae, Stenodemini

Pithanus hrabei Stehlik, 1952 (Figure 2)

Material: STI, Oppdal: Negardssætra [62.63009°N–9.59888°E], 850 masl., 24 July 2023, 1 macropterous ♀, SN among *Calluna vulgaris*, *Betula nana*, *Juniperus communis* and grasses on sheep grazed heathland, leg. FØ.

Remarks: This species was reported new to Norway by Coulianos (1998) based on one brachypterous female from ON, Vang: Helin collected by N. Knaben in 1944. The present record from Oppdal represent the second observation in Norway and the first macropterous individual.

Stenodema virens (Linnaeus, 1767)

Material: BØ, Ringerike: Sokna, [60.24130°N–9.92881°E], 25 May 2023, 1♀, SN, leg. FØ; ON, Sel: Otta, Solgjem [61.74595°N–9.55510°E], 26 May 2023, 1♀, SN, leg. FØ; Dovre: Dombfossen [62.06075°N–9.10990°E], 26 May 2023, 1♂, SN, leg. FØ; Vang: Vennis [61.15661°N–8.52449°E], 23 June 2023, 1♀, SN, leg. FØ; STI, Oppdal: Vikamoan [62.59325°N–9.62215°E], 15 September 2023, 3♂♂4♀♀, SN, leg. FØ; Munkvoll, Egga [62.61128°N–9.44642°E], 16 September 2023, 1♀, SN, leg. FØ; Pilen [62.60932°N–9.44746°E], 23 September 2023, 1♂1♀, SN, leg. FØ; Sankt-Olaberget [62.46507°N–9.57716°E], 23 September 2023, 2♂♂1♀, SN, leg. FØ.

Remarks: This species used to have a wide southeastern distribution in Norway (Coulianos 1998), however most of these records are very old, and search for the species in these areas during recent years has failed. For unknown reasons it seems like the species has decreased dramatically in northern Europe during the last decades (Skipper 2013). It was therefore surprising that the species was found at several places in more central parts of Norway in 2023, where it seems to have strong populations.

* *Teratocoris caricis* Kirkaldy, 1909 (Figure 3)

Material: HEN, Follidal: Øyan [62.11227°N–10.06023°E], 18 and 20 August 2022, several specimens SN from *Carex aquatilis*, leg. FØ.

Remarks: The species is new to Norway. *T. caricis* is very similar to *T. viridis* Douglas &



FIGURE 2. *Pithanus hrabei* Stehlik, 1952 from STI, Oppdal: Negardssætra. Photo: A. Staverløkk.



FIGURE 3. *Teratocoris caricis* (Kirkaldy, 1909) from HEN, Folldal: Øyan. Photo: A. Staverløkk.

Scott, 1867, but can be distinguished by the longer legs and antennae. The distribution is Holarctic with scattered records in Fennoscandia and the UK (gbif.org).

The European species of *Teratocoris* were revised by Wagner (1965), but he did not include *T. caricis*. Specimens of this species from Europe (Scotland) were described as *T. elegans* Woodroffe, 1967 (Woodroffe, 1967a), and later recognized as the Holarctic species *T. caricis* by Woodroffe (1969). The Nearctic species (which also include all the Nordic ones) are keyed in Kelton (1966). This key may be difficult to use for European material, as critical characters seem to vary (e.g., pilosity of hind tibiae and sexual characters of males). *T. caricis* may be identified by Woodroffe (1967a) or Gaun (1974).

The genus *Teratocoris* is still problematic taxonomically. DNA barcodes of *T. caricis* are identical with those of *T. viridis* in Europe, which may question their status as different species (BOLDsystems.org 2023). Wagner (1965) described a subspecies *T. saundersi unicolor* from Central Europe, which differs from *T. saundersi saundersi* Douglas & Scott, 1867 based on shorter antennae. He also mentions that specimens from northern Norway, formerly identified as *T. herbaticus* Uhler, 1887 (= *saundersi sensu* Kelton 1966) might belong to the subspecies *T. s. unicolor* based on the shorter antennae. This substantial variation in *T. saundersi s.l.* as well as the species pair *T. caricis/T. viridis* should be studied further, and a comprehensive review of the genus including molecular methods is needed.

Trigonotylus fuscitarsis Lammes, 1987

Material: NSI, Saltdal: Junkerdal, Rauberglia [66.80112°N–15.60120°E], 23 July 2023, several specimens SN among grasses, leg. FØ.

Remarks: This species was reported new to Norway from NTI by Coulianos (1998). The species is probably widely distributed in northern Norway.

Trigonotylus psammaecolor Reuter, 1885

Material: RY, Klepp: Boresanden [58.8086°N–5.5489°E], 11 August 2020, 3♂♂2♀♀, on *Ammophila arenaria*, leg. JB.

Remarks: This species is previously known from RY (Warloe 1924) and Ø (Coulianos 1998). Recent search for the species among the host plant *Ammophila arenaria* at Hvaler (Ø), Åros, Lomsesanden and Kviljo (VAY) has failed, and most likely the species is very local and restrictedly distributed in Norway. However, a directed search for the species along the sandy coast of Rogaland (Jæren) would probably give a better view of the population status.

Orthotylinae, Orthotylini

* *Blepharidopterus diaphanus* (Kirschbaum, 1856)

Material: HES, Våler: Våler sentrum [60.66670°N–11.82793°E], 7 August 2022, 5♂♂, beaten from *Salix triandra* along the river Glomma, leg. FØ.

Remarks: The species is new to Norway. It has a general southern distribution elsewhere in Fennoscandia. Records from Denmark are mostly from riverbanks and water edges (Skipper 2013).

* *Heterocordylus tumidicornis* (Herrich-Schaeffer, 1835) (Figure 4)

Material: Ø, Hvaler: Asmaløy, Viker [59.04151°N–10.94932°E], 11 July 2011, 1♀, leg. FØ.

Remarks: The species has never been published explicitly as new to Norway, although included in Red List assessment from 2015 (Henriksen & Hilmo 2015) based on the present record. Elsewhere in Scandinavia there are scattered occurrences in southern coastal areas where the host plant *Prunus spinosa* grows (Gaun 1974).

* *Brachynotocoris puncticornis* Reuter, 1880 (Figure 5)

Material: AK, Oslo: Vestre Aker gravlund [59.93579°N–10.72867°E], 3♀♀, 1 August 2022, leg FØ & AS; 24 August 2022, 1♂2♀♀, beaten from *Fraxinus excelsior*, leg. FØ; Steinsparken [59.92924°N–10.73077°E], 1 September 2022, 1♂3♀♀, beaten from *Fraxinus excelsior*, leg. FØ.

Remarks: *B. puncticornis* is new to the Nordic countries. The species is originally distributed



FIGURE 4. *Heterocordylus tumidicornis* (Herrich-Schaeffer, 1835) from Ø, Hvaler: Asmaløy. Photo: A. Staverløkk.

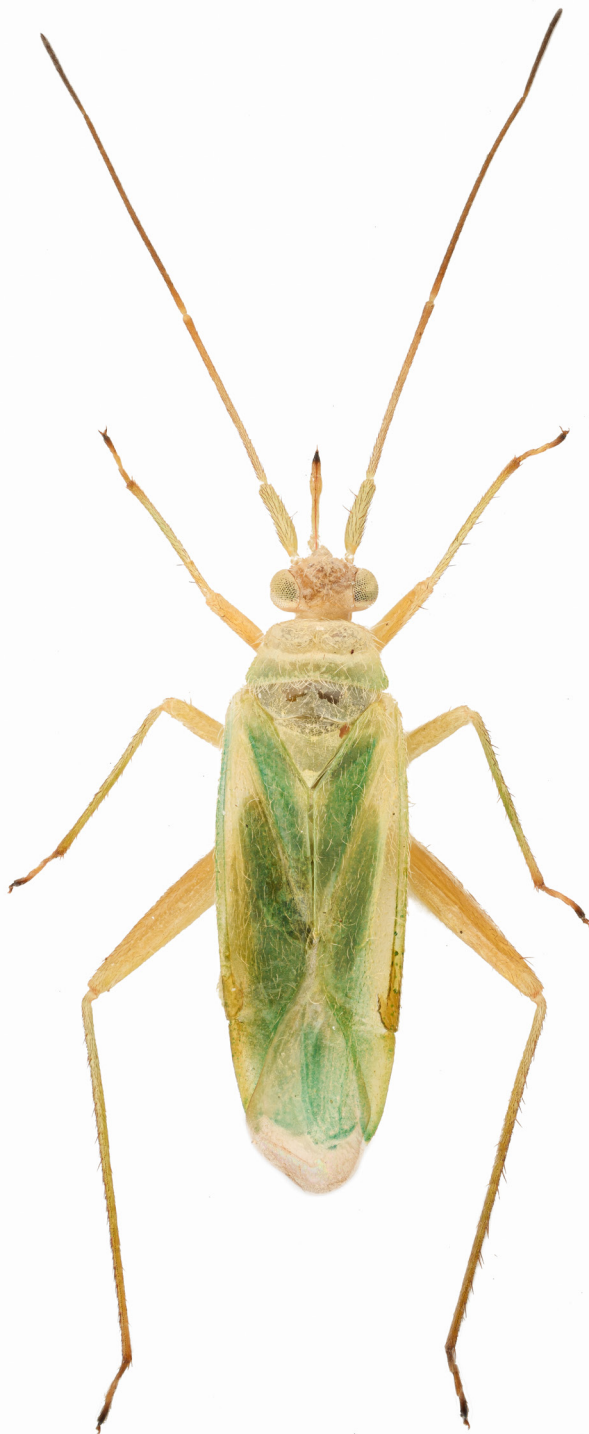


FIGURE 5. *Brachynotocoris puncticornis* Reuter, 1880 from AK, Oslo: Vestre Aker gravlund. Photo: A. Staverløkk.

in the Mediterranean area, but it has expanded northwards during the last decades. It was recently recorded from Britain and the Netherlands (Nau & Brooke 2007, Aukema 1990). Thus, the Norwegian records probably represent a rather new establishment. The species lives exclusively on *Fraxinus excelsior*. Species identification can be performed using Pagola-Carte (2010). The short rostrum and antennal segment three longer than the second, distinguish *B. puncticornis* from all similar looking green and slender Miridae.

* ***Orthotylus concolor* (Kirschbaum, 1856)**

Material: VAY, Lillesand: Persbekk [58.26744°N–8.33509°E], 6 August 2022, several specimens beaten from *Cytisus scoparius*, leg. FØ & AS; Søgne: Årossanden [58.07466°N–7.81641°E], 19 July 2023, several specimens beaten from *Cytisus scoparius*, leg. FØ.

Remarks: The species is new to Norway. *O. concolor* was found together with the even more numerous species *O. virescens* (Douglas & Scott, 1865). The fauna of true bug on *Cytisus* has probably established quite recently in Norway as the plant has expanded its distribution. *O. virescens* was published new to Norway by Hågvar (2010).

* ***Orthotylus rubidus* (Puton, 1874)** (Figure 6)

Material: Ø, Fredrikstad: Skjeløy, Gunnhildskjær [59.28046°N–10.74293°E], 25 August 2021, several specimens SN in salt marsh with *Salicornia europaea*, leg. FØ, AS & GE.

Remarks: The species is new to Norway. Although the species was very numerous at the site, this type of salt marsh represents a rare nature type restricting the potential for further occurrences of the species substantially. The species is known from three localities in Denmark (Skipper 2013), and a few localities along the Swedish west coast (Artportalen 2023).

***Orthotylus virens* (Fallén, 1807)**

Material: BØ, Hole: Sundvollen [60.06602°N–10.31221°E], 17 July 2023, several specimens beaten from *Salix pentandra*, leg. FØ.

Remarks: There are only a few, more than 100 years old records of this species from Norway

(Warloe 1924). The present record derives from the same area as the old ones, which indicates that the species have been present in the Tyrifjord-area for a long time. Directed search towards the host tree *Salix pentandra* could probably reveal a wider distribution of the species.

***Pseudoloxops coccineus* (Meyer-Dür, 1843)**

Material: VE, Horten: Karljohansvern [59.42937°N–10.49107°E], 16 July 2023, 1♂4♀♀, beaten from *Fraxinus excelsior*, leg. FØ; AAY, Risør: Lille Sønleed, [58.76752°N–9.08735°E], 17 July 2023, 1♂1♀, beaten from *Fraxinus excelsior*, leg. FØ.

Remarks: This species was published new to Norway by Coulianos (1998) based on a record from AK, Oslo Hovedøya in 1980. There are additional recent records from AAY, BØ, AK and OS (Artsdatabanken 2023a). The species is exclusively associated with *Fraxinus excelsior* and has a scattered distribution in southern Scandinavia (Skipper 2013).

* ***Reuteria marqueti* Puton, 1875**

Material: AK, Oslo: Nordre gravlund, [59.93748°N–10.74748°E], 8 September 2017, on *Rhododendron* sp., leg AE; Fagerborggata [59.93259°N–10.72842°E], 31 August 2022, several specimens beaten from *Tilia x europaea*, leg. FØ.

Remarks: The species is new to Norway. *R. marqueti* was originally distributed in southern and central Europe and has dispersed northwards during recent years. It was found new to the Netherlands in 1987, England in 2006, Belgium in 2009, Denmark and Finland in 2012. (Skipper 2013), and Sweden in 2015 (Szpryngiel & Coulianos 2017). The species seems to prefer *Tilia*, however it is recorded from several different tree species (Skipper 2013).

Phylinae, Phylini

* ***Amblytylus nasutus* (Kirschbaum, 1856)**

Material: VAY, Kristiansand: Kjevik, Bøen [58.20807°N–8.08621°E], 19 June 2023, 1♂, SN in dry meadow, leg. FØ.

Remarks: The species is new to Norway. *A.*

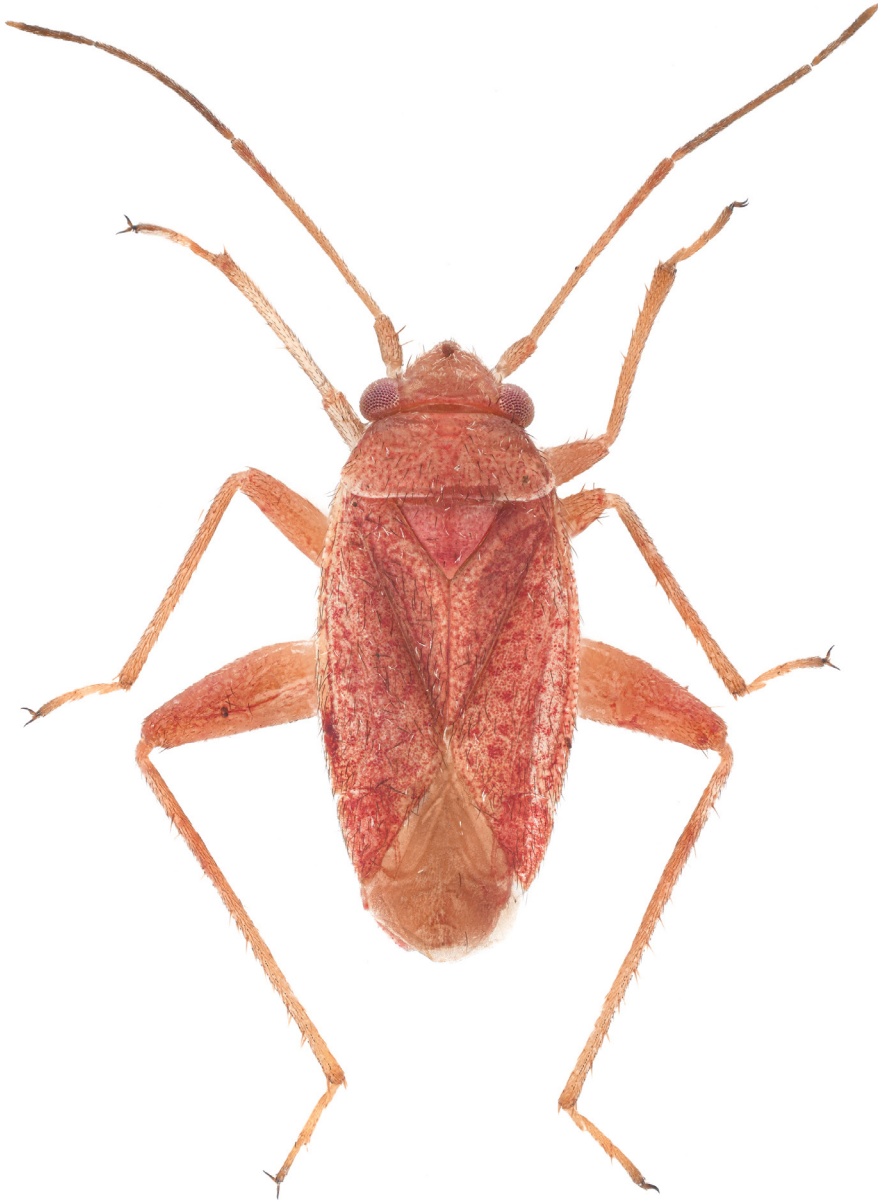


FIGURE 6. *Orthotylus rubidus* (Puton, 1874) from Ø, Fredrikstad: Skjeløy, Gunnhildskjær. Photo: A. Staverløkk.

nasutus is widely distributed in coastal areas of southern Scandinavia. The Norwegian occurrence of the species is therefore not surprising. The species is associated with different species of grasses (Skipper 2013).

*** *Asciodema obsoleta* (Fieber, 1864)**

Material: VAY, Lillesand: Persbekk [58.26744°N–8.33509°E], 19 July 2023, 5♀♀, beaten from *Cytisus scoparius*, leg. FØ; Søgne: Årossanden [58.07466°N–7.81641°E], 19 July 2023, 10♀♀ beaten from *Cytisus scoparius*, leg. FØ.

Remarks: The species is new to Norway. The few individuals (only females) were found among massive occurrences of *Orthotylus virescens* and *O. concolor* on *Cytisus scoparius*. The fauna of true bug on *Cytisus* has probably established quite recently in Norway as the plant have expanded its distribution. The species was found new to Sweden in 1982 (Gillerfors & Coulianos 2005).

Europiella decolor (Uhler, 1893)

Material: Ø, Hvaler: Asmaløy, Landfast-odden [59.04600°N–10.93005°E], 25 August 2022, several specimens SN from *Artemisia maritima*, leg. FØ & GE; Moss: Eldøya [59.32797°N–10.64959°E], 26 August 2022, several specimens SN from *Artemisia absinthium*, leg. FØ & GE.

Remarks: The species was previously only known from AK in Norway (Coulianos 1998). Specific search on the host plants *Artemisia maritima* and *A. absinthium* revealed species rich populations on the two sites. However, since the host plant is very scattered distributed in Norway, *E. decolor* should be correspondingly rare.

* *Monosynamma maritimum* (Wagner, 1947)

Material: VAY, Farsund: Lomsesanden [58.06392°N–6.78860°E], 4 July 2008; 3 August 2022, several specimens SN from *Salix repens*, leg. FØ; Kviljo [58.07321°N–6.67512°E], 3 August 2022, several specimens SN from *Salix repens*.

Remarks: The species is new to Norway, however Warloe (1924) mentions *M. nigrifolia* (Zetterstedt, 1838) (= *M. bohemani* Fallén, 1829) from RY, Jæren, which probably belong to *M. maritimum* (see Woodroffe 1967b). The present material was identified using the key in Woodroffe (1967b) with measurements of ratios, however these characters may be taxonomically problematic (see under *M. sabulicola*). The species is distributed along the North Sea coast in northwestern Europe and was recently also recorded new to Sweden (Gillerfors & Coulianos 2005).

* *Monosynamma sabulicola* (Wagner, 1947)

Material: STI, Melhus: Nedre Leberg

[63.18423°N–10.30108°E], 15 August 2022, several specimens beaten from *Myricaria germanica*, leg. FØ; Midtre Gauldal: Støren [63.04349°N–10.29405°E], 15 August 2022, several specimens beaten from *Myricaria germanica*, leg. FØ; HES, Åsnes: Hof E [60.54721°N–12.04293°E], 9 July 2021, several specimens beaten from *Salix* sp., leg. FØ.

Remarks: The species is new to Norway. The genus is taxonomically very problematic, and the species identities are based on differences in color, body shape and ratios that may vary across species. The genus is therefore in urgent need of further study with an integrative approach that should also include molecular methods. The present material was identified using the key in Woodroffe (1967b) with measurements of ratios. The host records from *Myricaria germanica* along the river Gaula is interesting as the only host plants mentioned in the literature belong to *Salix*.

Parapsallus vitellinus (Scholtz, 1847)

Material: AK, Oslo: Bygdøy, Wedels vei [59.91369°N–10.68886°E], 18 June 2023, 2♂♂1♀, beaten from *Larix decidua*, leg. FØ & GE; STI, Trondheim: Angeltrøa [63.41772°N–10.45905°E], 1 and 15 July 2023, several specimens beaten from *Larix decidua*, leg. FØ.

Remarks: *P. vitellinus* was published new to Norway from VE and AAI by Endrestøl & Ødegaard (2011). The species is probably common many places where the host plant *Larix* grow, and thus it may be predicted that the species is widely overlooked in Norway. According to Wachmann *et al.* (2004) it may also be found on *Picea abies*.

* *Psallus pseudoplatani* Reichling, 1984

Material: AK, Oslo: Bygdøy, Wedels vei [59.91369°N–10.68886°E], 18 June 2023, several specimens beaten from *Acer pseudoplatanus*, leg. FØ & GE; Dronningberget [59.91400°N–10.68284°E], 18 June 2023, several specimens beaten from *Acer pseudoplatanus*, leg. FØ & GE; Ekebergskrånningen [59.89511°N–10.76111°E], 18 June 2023, several specimens beaten from *Acer pseudoplatanus*, leg. FØ & GE.

Remarks: The species is new to Norway. *Psallus pseudoplatani* is an expanding species associated with *Acer pseudoplatanus* which is considered an alien tree species still spreading in Norway (Artsdatabanken 2023b). *P. pseudoplatani* was recorded new to Denmark in 2010 (Skipper 2013) and Sweden in 2019 (Artportalen 2023).

* *Psallus montanus* Josifov, 1973

Material: VE, Horten: Adalstjern [59.37020°N–10.43448°E], MT 21 June–17 July 2023, 1♂, leg. FØ; AAY, Birkenes: Nordåsen [58.33267°N–8.24008°E], 1 June 2009, 1♂, leg. KB.

Remarks: These are the first published records of this species from Norway. *P. montanus* is closely related to *P. betuleti* (Fallén, 1826) and was considered a valid species by Rieger & Rabitsch (2006). Elsewhere in Fennoscandia the species is found in southern Sweden and Finland (Szpryngiel & Coulianos 2017, Rintala & Rinne 2010). Norwegian material of *P. betuleti* should be revised to clarify the distribution of *P. montanus*.

Psallus flavellus Stichel, 1933

Material: AK, Vestby: Son, Erikstad [59.55072°N–10.69424°E], 13 July 2022, 1♀, beaten from *Fraxinus excelsior*, leg. FØ; Oslo: Ekebergskråningen [59.89511°N–10.76111°E], 18 June 2023, 1♂, beaten from *Fraxinus excelsior*, leg. FØ; Bygdøy, Wedels vei [59.91369°N–10.68886°E], 18 June 2023, 1♂, beaten from *Fraxinus excelsior*, leg. FØ; VE, Horten: Karljohansvern [59.42937°N–10.49107°E], 16 July 2023, 1♂1♀, beaten from *Fraxinus excelsior*, leg. FØ; BØ, Asker: Filtvedt [59.56888°N–10.61067°E], 13 July 2022, 1♂ beaten from *Fraxinus excelsior*, leg. FØ.

Remarks: Endrestøl & Ødegaard (2011) point out that the occurrence of *P. flavellus* in Norway needs confirmation due to lack of reference material. The preset data indicates that the species might be rather common in *Fraxinus excelsior* around the Oslofjord-area.

Psallus lapponicus Reuter, 1874

Material: STI, Trondheim: Kuset [63.38613°N–10.60327°E], 31 August 2020, 1♀, beaten

from *Picea abies*, leg. FØ.

Remarks: *P. lapponicus* is recorded from NSI and NTI (Endrestøl & Ødegaard 2011) and FØ (Roth & Coulianos 2014). The new record from STI represents the southernmost occurrence of the species.

Psallus luridus Reuter, 1878

Material: STI, Trondheim: Leangenbukta [63.44102°N–10.40975°E], 28 August 2022, 1♀, beaten from *Larix deduca*, leg. FØ; Angeltrøa [63.41772°N–10.45905°E], 1 July 2023, 1♂1♀; 15 July 2023 2♀♀, beaten from *Larix decidua*, leg. FØ.

Remarks: *P. luridus* was published new to Norway from RY by Endrestøl & Ødegaard (2011). The species is probably common many places where the host plant *Larix decidua* grows, and most likely the species is widely overlooked in Norway.

* *Psallodema fieberi* (Fieber, 1864)

Material: TEY, Kragerø: Kragerø kirke [58.87111°N–9.41386°E], 20 June 2023, 2♂♂1♀, beaten from *Ulmus glabra*, leg. FØ.

Remarks: The species new to Norway. It is exclusively associated with *Ulmus* and has been found sporadically elsewhere in southern Scandinavia (Skipper 2013).

* *Tytthus pubescens* (Knight, 1931)

Material: Ø, Aremark: Teigen [59.25454°N–11.64465°E], 3 October 2023, 1♀, SN, leg. FØ; Rakkestad: Klever [59.26270°N–11.35002°E], 20 August 2017, 3♀♀, in flooded debris, leg. FØ; Marker: Gjølsjø [59.44049°N–11.68768°E], MT 25 June–5 July 2018, 1♂, leg. FØ; VE, Holmestrand (Hof): Rønnebergdammen [59.51566°N–10.09504°E], MT 19 July–3 August 2021, 1♂, leg. FØ; HES, Åsnes: Hof E [60.54721°N–12.04293°E], 24 August 2021, 1♀, SN, leg. FØ; HEN, Follidal: Øyan [62.11227°N–10.06023°E], 20 August 2022, 2♀♀, SN among *Carex aquatilis*, leg. FØ; STI, Midtre Gauldal: Støren, Frøset, Litlvatnet [63.04729°N–10.32909°E], 15 September 2021, 1♀, SN, leg. FØ; Oppdal: Vikamoan [62.59357°N–9.62654°E], 19 September 2021, 1♀, SN, leg. FØ; STY, Agdenes: Litlvatnet

[63.61810°N–9.66807°E], MT 25 July–11 August 2021, 1♂, leg. FØ.

Remarks: The species is new to Norway and has a northern distribution in Europe. It is found in different kinds of wetlands where it can be associated with different grasses, sedges or reeds. The many new records indicate a wide distribution in southern and central Norway.

Discussion

The present paper documents 24 species of Miridae not previously recorded from Norway. Most of these species almost certainly have established in Norway during the last decades because of range expansions. Many newcomers are documented from northern Europe in recent years e.g., from Norway (Ødegaard & Endrestøl 2007), Sweden (Gillerfors & Coulianos 2005), Denmark (Skipper 2013) and the Netherlands (Aukema 2003). This may be a result of increased trade and transport of e.g., ornamental plants across national borders, combined with climate change which increase the probability of species with origin in more southern regions to establish further north.

On the other hand, species such as *Teratocoris caricis*, *Blepharidopterus diaphanus*, the *Polymerus* species, *Orthotylus rubidus*, and perhaps *Pinalitus viscicola* have probably been established in Norway for a long time and have been overlooked by former collectors. The same should be true for the *Monosynamma* species and *Psallus montanus*, but these are currently revealed because of revised taxonomic interpretation.

With the present article a total of 208 species of Miridae have been recorded from Norway. These numbers however depend on the taxonomic interpretations of some difficult genera for instance *Macrolophus*, *Monosynamma* and *Teratocoris*, as well as the two species pairs *Globiceps juniperi* Reuter, 1902 / *G. salicicola* Reuter, 1880 (see Heiss 1988), and *Deraeocoris morio* (Boheman, 1852) / *D. scutellaris* (Fabricius, 1794) (see Rieger 1996).

Still more species of Miridae are expected to establish in Norway in the years to come as populations of several other species are spreading

towards the north. Some species may also still be overlooked in Norway.

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